The Builder.

VOL. XLI. No. 2068. SATURDAY, JULY 30, 1881.

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Water Famine in London.

THE idea of a water famine, with the thermometer approaching 100° Fahr., is not an agreeable one. But during the past few days more than one part of London has had a very broad hint that such a calamity is not impossible. On the 19th of July, in his place in the House of Commons, Mr. W. H. Smith asked the President of the Local Government Board whether he was aware that in those districts of London supplied by the Grand Junction Company there had been an almost total suspension of water supply, and whether the Local Government Board were prepared to exercise the authority they possess in order to make the Grand Junction Company comply with their statutory obligations.

Mr. Dodson had experienced,—we may be pardoned for saying it is satisfactory to hear,—the most direct appeal on this subject, from the fact of a deficient supply in his own house. He had also received notice of the failure of a high-service supply at Brixton, as to which inquiries had been set on foot. The right hon. gentleman also referred to past efforts to bring in a Bill on the subject of the water supply, which the Government had not considered it expedient to re-introduce during the present session. Thus the fact of failure is undisputed. The bursting of a main is said to have been one cause, but it is pretty evident that the mechanical resources of the company are not adequate to bear the stress of the unusual demand for water due to the heat of the month. Looking back to past years, we can say that the extra demand must have have amounted to at least 20 per cent, and very probably to more. Failure under such circumstances is not absolutely inexcusable, as far as any particular main is concerned, but what *is* inexcusable is the want of any alternative or supplemental system, by means of which the supply of so prime a necessary of life should be kept up pending the repairs of any fractured pipe or pump. Provision of this kind the customers of the water companies have the right to demand.

The Grand Junction Water Company supplies an area of 5¼ square miles, extending in a very irregular form from Charing Cross to beyond East Acton and Wormwood Scrubbs. Its expended capital, in 1878, was 1,170,125*l.* The character of the district that it supplies, or the costly nature of its works, is indicated by the fact that while the average expenditure of capital by the eight water companies of London is at the rate of 21·8*l.* per house, or 3·05*l.* per unit of population, the Grand Junction has laid out 31·5*l.* per house, or 3·45*l.* per head of its customers. The daily supply furnished by this company is a little above the average of 32·25 gallons per head, being (for the year of which we have the details analysed) 33·6 gallons per head per diem, or 57·7 tons of water per soul per annum. The working expenses of this company, however, are unusually heavy, amounting to 6*s.* 8*d.* per 100 tons of water, while the average cost of the eight companies, including the Grand Junction, is 4*s.* 8*d.* per 100 tons. The main element in this extra cost is the pumping, which cost 3*s.* 9½*d.* out of the above-mentioned 6*s.* 8*d.*, the average cost of pumping for the whole of London being 1*s.* 4½*d.* per 100 tons of water delivered. Nor is it difficult to point out the cause at once of the cost of pumping, and of the extra stress that is evidently thrown upon the machinery and connexions of the Grand Junction Company. Taking its supply from the Thames at Hampton, the company serve a district of which many portions lie above the 85 ft. contour line, and of which the highest point is 118 ft. above Trinity high-water mark. To this height has to be added the height of the houses, say 40 ft. Thus, subject to any relief from districting and subsidiary lifts,—if such there be,—there is a pressure of 158 ft. of head, or nearly five atmospheres, on the mains and connexions of this company, and an amount of dead weight is lifted by the pumps which, measured by the tolerably safe rule of actual cost, is more than two and a half times as much, per ton of water distributed, as that which is raised by the Kent Company from their deep wells. It is thus easy to see a physical reason for the fact that it is the Grand Junction Company which is the first to suffer under the extra stress of an increased summer consumption of water.

Not that the Grand Junction Company is by any means alone in its trouble. The Southwark and Vauxhall has received the same equivocal compliment of Parliamentary notice. By that safety-valve, public indignation is allowed to exhale, at extremely small inconvenience to the companies of which complaint is made. One thing, we apprehend, it has been within the power of the local authorities to control. We have little doubt that much of the want of water, where its absence is most dangerous, that is to say, in the interior sanitary arrangements of the dwelling-house, has been due to the over-watering of the streets. In many cases this has resulted in the production of a thick mud, the steam from which, with the thermometer at 95° and above, has been anything rather than conducive to the comfort or health of the inhabitants of London.

We wish to take the occasion of a pinch which has been so sensibly felt by so many of the inhabitants of London, to renew our often-repeated warning that the water-supply of London is a subject that ought to be regulated on the principles of hydraulics and of sanitary engineering, rather than made a stalking-horse for the speculator, whether financial or political. More particularly have we felt it to be a duty to do this since the curious oversight made by the Registrar-General in 1876, when that officer ventured to assert that the Metropolitan Board, by borrowing 20,000,000*l.*, at 4 per cent., could supply the ratepayers with gas and water at half the present cost. The learned statistician would have been, no doubt, not far from the mark but for his unfortunate assumption that stock paying 8 and 10 per cent. could be purchased by the authorities at the par price of a 3½ per cent. stock. This tremendous oversight having once been made, a perfect harpy flock of speculators endeavoured to swoop upon the prey. We have been, we believe, alone or nearly so in the press, in pointing out on the one hand the inadequacy of the estimate above cited; then the inadequacy of that brought forward by Mr. Chadwick in the rooms of the Society of Arts (on the occasion of the water conference), which proposed to purchase, not gas and water companies for twenty millions, but water companies alone for twenty-six millions. Again were we alone in warning the public, in the opposite direction, against the calculations by which the late Mr. E. J. Smith misled the late Government into the most unfortunate proposal of a plan which would have burdened London with no less a sum than 38,000,000*l.*,* for merely obtaining the property and control of the water-works. Thus between March, 1876, and March, 1880, we have had to maintain (and to prove by details) first, that it was absurd to talk of purchasing the water companies' property for ten millions, or even for twenty-six millions, of money; secondly, that it was absurd (and worse than absurd) to offer them thirty-eight millions for the same property, *plus* the moderate growth in the four years intervening. These are points which ought never to be forgotten when water supply reform is on the *tapis*.

How is it, it may be asked, that the *Builder* has taken a steady middle-course during the four years in which the pendulum has swung so tremendously from side to side as from a 10-million to a 38-million valuation by Government officials?

For this reason, we venture to reply: We have regarded an hydraulic problem as affected by hydraulic considerations, and a sanitary problem as affected by sanitary considerations; and we have given unwearied time and pains, first, to ascertain, and then to co-ordinate, the actual *data* of the case. And by this method (whatever be the success of any particular attempt to use it), and by this method alone, we hold that the problem can be solved.

On the contrary, the first idea of the Registrar-General was to effect a large economy by

* See *Builder*, vol. xxxviii., p. 302.

putting the control of the water-works in the hands of the Metropolitan Board of Works,—an economy which that officer was so anxious to effect that he entirely overlooked the most obviously controlling *data*. The object of the second attempt (we have by us all the papers, printed but not published, for reasons at which we have before hinted) was to enrich private speculators at the expense of the water companies. The object of the third effort was to introduce a grand scheme of Government, or at least of administrative, control. In neither of these cases did the persons who came before the public begin at the beginning, or regard the hydraulic problem as an hydraulic problem. It is so much easier to make assumptions than to analyse facts! That a central Board would do things so much cheaper was the assumption; why this should be so no one attempted to show.

If any good is to be done in the way of improving the water-supply of London, we venture to assert it will only be done by modestly beginning at the beginning. We have to ascertain, first, the requirements of the case; secondly, the mode in which these requirements are now met; thirdly, the mode in which these requirements are to be better met; and fourthly, the equitable and determinate cost of such changes. We are not now about to enter further into this great and important question than we feel compelled to do by the partial breakdown of the last week.

The main reason for a central authority or unity of control in the London water-works, as far as economy of working is concerned, is the saving that can be effected by districting, that is to say, by supplying water according to zones of level. These zones exist on the ground, irregularly, it is true, but in a manner which may be compared to the successive coats of an onion. The territories of the companies, on the other hand, are distributed more like the cloves of an orange. Thus the Thames water is forced up 158 ft. and more by the Grand Junction Company, while the reservoirs of the New River Company at Stoke Newington are 87 ft. above Trinity high-water mark. To supply the higher portions of the Grand Junction district from the New River reservoirs would thus save half the cost of pumping, or 3s. 4d. per 100 tons of water. This is not a vague estimate, such as those brought forward in support of Sir R. Cross's Bill as to the economy of "concentration," but a simple, definite, certain, engineer's calculation. We are not in a position to state whether this saving might be effected over the entire district served by the Grand Junction Company, because we are not aware of the arrangements of that company for subsidiary lifts, if any. If we suppose the water to be forced by one set of pumps into the entire closed system of pipes, it is certain that the five atmospheres' resistance must act on the entire quantity. In that case an unnecessary expense of more than 15,000*l.* per annum is incurred in the 65,000*l.* of working cost of this company alone. That, as we admit, may be an excessive view of the case; but that whatever portion of the district of this company lies at an elevation of more than 87 ft. above the Thames, might economise that proportionate amount of pumping, if served from reservoirs which the water enters by gravity at that level, is incontestable.

Here, then, in the lesson of this dry and hot July of 1881, we may read a very forcible illustration of the principles advocated in our pages. Engineering questions must first be approached on engineering principles, not on those of the amateur, the speculator, or the politician. When the intelligence of London has grasped this truth, water reform will follow.

Clever Young Man!—A correspondent writes:—A prize being offered for the best plan for a new chapel-of-ease for Bowness and Windermere, about fifty plans were sent in from various parts of the country, and by many well-known and eminent architects. On Saturday, the 25th ult., the committee for examining and choosing the plans met, and a design was fixed upon, the motto of which was "Truth." After passing the usual form of approval and election, the name of the successful architect, wonderful to relate, was found to be Mr. Joseph Pattinson, the fourth son of Mr. Thomas Pattinson, of Bowness, now in the employ of Mr. Ferguson, of Carlisle. These things will happen in the best-arranged competitions.

MONTFAUCON.

WE spoke recently of an English translation of Winckelmann's famous "History of Ancient Art,"—the work of an American student,—which has lately made its appearance in England. If to the great German antiquary modern archæology owes its debt of gratitude for the new direction given by his famous book to the study of Classic art, some recognition at least is due to a predecessor of Winckelmann in his labours,—Montfaucon. Montfaucon's name may be almost linked with that of Winckelmann in the reputation it enjoys with the reading public; both are eminently respectable and respected authorities, from whose works and efforts, however, the present generation feels it has little to learn,—they are fortunate, indeed, in comparison with many other studious antiquaries of the past whose names can alone be found in the biographical dictionaries, and whose works remain in their dusty resting-places on the long undisturbed upper shelves of old libraries. But we owe to these seekers into the past our gratitude; indeed, to many we owe the commencements of the noble collections that now rank among the most valued possessions of the nation; we owe to them the fostering, in ages too often given over to frivolity, of the spirit which has led in our day to such remarkable results, and in the case of our local antiquaries we should ever be grateful to them for the gathering and garnering of stores of information we should now find it impossible to acquire for ourselves.

A hundred and sixty-two years separate us from the publication of Montfaucon's first great antiquarian work, "Antiquité Expliquée," with its mass of information on the details of Classic existence. Montfaucon, indeed, may be said to be the first modern writer to have approached this prolific field of research, but with what imperfect tools we can at this date imagine. Sturdily, however, he buckled himself to the task, and, aided by an enthusiasm that was eminently calculated to overcome all obstacles, he laboured, toiled, and cleared the field, the crop from which we now all have it in our power to reap. It was not a mere essay that the learned Benedictine monk attempted; the folio volumes he produced, with their numerous plates, embrace in a very comprehensive manner, even for the present day, the mythology and life of antiquity. We must thank Montfaucon for having first searched the classic authors with a view to elucidating this study. The philosophy of the ancients, or, as our great Bacon calls it, "the wisdom of the ancients," had, till Montfaucon's time, formed the interest of antiquity; since Winckelmann's time, for on him we must look as the founder of the critical study of Classic art, archæology has taken its rank among the subjects of inquiry for Classic students, archæology proper the study of the beginnings of art. But Winckelmann in Montfaucon had a predecessor, who, if he did not approach the subject in the same spirit or with the same aims, at least may be granted the merit of having passed over the same ground; and when we take into consideration the epoch in which he lived, we cannot but be surprised at the result of his efforts, efforts made while the science of which he was so devoted a student was but in its infancy, and supplied with but the most elementary materials. None who may be led to turn over the folio volumes which the industrious Benedictine monk produced, and the numerous illustrations which accompany the text, can fail to be struck by the erudition and research of the author. If of the illustrations it may be said that their quality scarcely bears a relation to their quantity, their merit and accuracy have alone been surpassed since the aid of photography has placed it within our power to produce trustworthy representations of the works of the past. It is scarcely yet in England that we can afford to cavil at the want of careful observation in the illustration of Montfaucon's works. As for their value for reference purposes it remains of course, unchanged.

Montfaucon's "Antiquité Expliquée," translated shortly after its appearance into excellent English, by Humphreys, and published by old Tonson,* has, of course, long since been set aside by later works. We have it, however, on the authority of so distinguished a bibliographical student as Brunet, that it has never been superseded, though the information he gathered has largely served to aid the researches of his successors; indeed, when a work embraces, as does his, a consideration of the whole of Classic mythology treated in detail, with its figured representation, the religion of Egypt, Greece, and Rome, and many other of the nations of antiquity; the costume of the ancients, the plan of their houses, the figured reproductions and description of their various utensils, vases, measures; their public baths, their theatres, and games; their customs and rites, marriage ceremonies, punishments, &c.,—their arts, and the various instruments of their trades and professions;* the whole military system of the Greeks and Romans, their campaign operations, their bridges, aqueducts, navigation, shipbuilding, seaports, &c.,—it can be understood that such a work exhausted all the contemporary existing sources of information. Need we be surprised to learn that, on the appearance of the book "everybody was desirous to read it, —even the ignorant." In two months' time the edition of 1,800 copies was exhausted.†

The production of one such work might appear to afford an adequate effort for the life of any man, but the methodical course of study of Montfaucon enabled him to produce many other works. In the Classic authors he was, as might be supposed, deeply versed; with the bewildering commentary-riddled writings of the early Church Fathers and their complicated theology, he was no less familiar, and numerous are the works which the Catholic Church owed to the industrious Montfaucon. He found time to visit Italy very thoroughly in search of manuscripts, and the summary of his happy wanderings through the then undisturbed convent libraries of the Peninsula he has described at length in his interesting "Diarium Italicum," the fame of the author of which warranted the publication, in London, of two English translations.‡

But not here do Montfaucon's labours end, the continuation into modern times of the task he had undertaken in the explanation of "figured antiquity" he planned and in great part executed. His "Monuments de la Monarchie Françoise" is a remarkable production. In no narrow spirit of idolatry to antiquity and its lessons he approached the subject of the monumental remains of France during the Middle Ages, and where no work previously existed to assist him in the smallest degree, he produced, in the early years of the last century, a work which, if it has since been superseded by later studies, has served as the scaffolding on which they have been built up. Like his work on antiquity, it is no mere sketch, supplied with incomplete information; the sources of reference show an acquaintance with the art of his country that is calculated certainly to amaze the modern reader when he remembers how, until positively recently, the art of the Middle Ages both in France and England was persistently overlooked.

Montfaucon's "Monuments de la Monarchie Françoise" gives us in passably accurate illustrations,—wonderful for the day in which they were produced,—a review of the artistic productions of the various reigns of the French monarchy; an historical sketch is given of each reign, and a fair share of text is devoted to the explanation of and authorities for each of the numerous plates that adorn the volumes. Through reign after reign the illustrations run, from earlier works than the Bayeux tapestry, which is here reproduced in a number of double folio page illustrations, and with an accuracy which, if it is no longer acceptable to those familiar with the photographs made of this interesting historic work, and published some years since by the Arundel Society, is still sufficient for almost all reference purposes.

The success of Montfaucon's "Monuments of the French Monarchy" was scarcely less than

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* This translation, "Antiquity Explained," was published at London, 1721-25, ten vols. in three, folio.

* "In the arts," Montfaucon remarks,—we quote Humphreys' translation,—"there are three things to be considered, the precepts, the instruments, and the works. Of the first of these we shall take no notice, it being both beyond our ability to treat of it, and also what would require as large a work as this collection." Of architecture he truly remarks that it requires the greatest number of instruments. He then proceeds to describe, with illustrations, the classic axe, rule, square, the compass, "one with straight the other with crooked feet"; the plummet, chisels made of brass, for, as he observes, the ancients were acquainted with methods by which brass could be rendered of great strength, plates of brass being used to bind the courses of stone [bronze is the metal, doubtless, meant by Montfaucon]; for the same purpose ties of wood were used in antiquity, shaped at each end in swallow's tails. The joiner's tools are also described,—the saw, the mallet, and plane, of which a somewhat rude representation will be found at p. 210 of the third volume of Humphreys' translation.

† Vinet's "Bibliographie des Beaux Arts."

‡ One published 1713, the second, by J. Henley, 1725.

that of his "Antiquity Explained," and, as in the case of that work, an English translation appeared (1750) embellished with no fewer than 300 plates. If Montfaucon's work has been long since superseded by later publications, the writings of Labarte, Du Sommerard, Alex. Lenoir, d'Agincourt, Louandre, the far too little known Willemin, Viollet-le-Duc, and, more recently, Lacroix, in his popular works on the Middle Ages, like those students, we must never refuse our meed of gratitude to the industrious old antiquary who, after a youth spent as it was customary for the youths of noble families of those days to indulge in, left a brilliant military career, during the stirring campaigns of Turenne, to devote himself till his death at the ripe old age of eighty-seven, to the seemingly less alluring pleasures of deep and earnest study. Born in 1655, he renounced the world at the exceptionally early age of twenty, and entered the Benedictine order; a visit to Italy in the last years of the seventeenth century,—a visit undertaken in the interests of his literary research, and the result of which he has left in his "Diarium Italicum," to which reference has above been made,—is the only incident that may be said to have broken this long lifetime of devoted study.

In one of the quiet side chapels of the interesting old church of St. Germain-des-Près in Paris, now rest, within but a few feet of the ashes of the great Descartes, and not far from the last resting-place of the poet Boileau, the remains of Dom Bernard de Montfaucon, side by side with those of his brother Benedictine Mabillon, a scarcely less distinguished antiquary than himself. In accordance with an excellent and almost undeviating system adopted by the Paris municipality, and the absence of which is much to be regretted in London,—a street in the neighbourhood of St. Germain-des-Près bears the name of Montfaucon.

WARMING AND VENTILATION AT THE SANITARY EXHIBITION, SOUTH KENSINGTON.

ONE of the first things that strikes the inquirer in attempting to sum up the results of this exhibition in regard to warming and ventilation, is that in this department at least there is not the slightest pretext for the application of the epithet "International" to the Exhibition. The committee, doubtless, did their best to induce foreign inventors to send their works, but have not succeeded. The Exhibition merely illustrates what has been thought of and practically carried out in England. We wish it were otherwise. A really International Exhibition of Appliances for Heating and Ventilation might be very instructive in showing us how such matters are dealt with in other countries. As it is, the international element, as far as apparatus is concerned, seems to be summed up in the apparition of an "Anglo-German stove," which we noticed with that label affixed to it. Perhaps it may be contended that some not unimportant nations have scarcely turned their attention to ventilation at all, not having yet arrived at the recognition of its importance; and probably English sanitarians have done more than any others in promoting attention to the subject; but in the matter of practical means of ventilation we probably might find that the Americans and the French have done the thing more completely, in some instances, than we have. The first point, however, is to get it recognised as a primary principle that buildings for human habitation ought all to be provided with effective means of continually changing the air, not by haphazard, but in a certain and reliable manner, and that domestic architecture in which this is not accomplished is incomplete and radically faulty. There is evidence in the Exhibition that there are a good many means already within reach by which efficient ventilation may be secured, if people can be got to regard this as a *sine quâ non* in a dwelling-house. At present very few people do so regard it, and as no system of ventilation is costless, they draw back from paying extra for what they still regard as a luxury rather than a necessity in house-building.

Considering the ventilating appliances generally, we seem to find a great deal of repetition of contrivances differing little either in theory or practical working. Ventilating cowls warranted to create an up-current are to be found in slightly varying forms all over the exhibition accompanied by models fixed on glass funnels with a bit of pith or cotton wool inside by which the drawing powers of the cowl can be visibly demonstrated. There is no difference in principle in these, and they all act properly in the models; but that does not take us very far. We all know how that an induced current is easily set up with contrivances of this kind: the real question is, Under what circumstances and in what direction are currents to be maintained for the production of ventilation? We find very little evidence of a real scientific principle in the conduct of ventilation in most of these contrivances and the methods of applying them. Inlets and extracts for ventilation must be considered conjointly and in regard to their effect upon each other, not separately. Ventilation consists in the provision of means for adequate inlet (without draught) and adequate extract, working in union with each other; and if it is decided on what principle inlet and extract are to be formed and regulated, the mechanical method of promoting extract becomes a mere matter of detail.

We may divide schemes of ventilation into three classes; those which may be termed natural ventilation, in which the difference of pressures between external pure air and internal vitiated air is relied upon to keep up the current; those which are worked by mechanical propulsion; and those which are in connexion with the heating system of the building, and actuated by artificial warmth. Among these there can be no doubt that mechanical propulsion is the most certain and effective, but it has the drawback that it involves a continual cost unless in the exceptional cases in which, as in buildings where machinery is constantly employed, a power already necessarily in action for the purposes of the building can be utilised to drive the ventilation also. It cannot, therefore, be expected that mechanical propulsion will come into general use for the ordinary run of dwelling-houses, although for the better class of houses Messrs. Verity's fan-propeller, driven by water, is a very useful form of ventilator. Its general use in large towns would involve too great a demand on the water supply, independently of the expense to individuals; but it is the only form of mechanical propulsion which we observed in the exhibition which would be at all suitable for even partial adoption for domestic ventilation.

Natural ventilation pure and simple may be said to have only one illustrator in the exhibition who lays special claim to that merit of naturalness. Mr. Boyle's system has this to recommend it in principle, that it follows the natural movement of air in an inhabited chamber, from the floor towards the ceiling, and extracts it from the upper part of the room. We have always held that the upper portion of the room is the place for the extract, and that it is absurd and unscientific to attempt to draw the vitiated air down again for extraction when it has once, heated by use, risen to the top of the room. On the other hand, admitting air through the skirting, even with the protection from direct influx which Mr. Boyle's apparatus provides, is too crude a method of inlet, and must create draughts along the floor when there is a fire burning. While the fire is burning, the current up the flue is supposed to assist in carrying off the vitiated air, the discharge for which is into the chimney, with mica valves light enough to open to the extract current, but closing the opening against back-draught. If the extract were made into a ventilation flue contiguous to and merely warmed by the smoke-flue, there would be little occasion for the mica valves, the proper action of which we very much doubt. And even if it were recognised as a success and universally adopted, where is all the mica to come from? Certainly a question to be asked.

There is another scheme which comes nearly under the head of natural ventilation, although it is rather complicated in its working, and that is the scheme proposed by Dr. Hayward and Dr. Drysdale, and shown in a working model of a house. Dr. Hayward's scheme (for it was his originally) was brought before the Institute of Architects and published in their Transactions some time ago, but the form shown in the Exhibition is modified in one particular, in that the "primary inlets," as they are called, are on the roof, whereas they were in the basement in the original scheme; the change has apparently been made with the view of getting purer air. The system, some of our readers may remember, is one in which no air is admitted into the house except through the contrived ventilating inlets, and no air suffered to escape except through the contrived outlet, which is an upcast shaft helped by the heat of the kitchen fire; in other words, the windows are fast and hermetically closed. The system appears to answer its purpose capitally, and to work exceedingly well; but it is useless to propound it, because no English people, except a few persons absorbed with fancies about ventilation, and willing to sacrifice everything to them, would ever consent to live in a house in which the windows would not open. The system is very ingenious; it has just the drawback that no one ever would adopt it, and therefore it must be dismissed as unpractical.

In this scheme, we may observe, Dr. Hayward introduces the pure air from the "pure-air chamber," at the top of the room, and removes it also at the top, at the further side. Introduction at the top of the room we believe to be a mistake to begin with. Dr. Hayward speaks of the air as falling into the room through the inlet and then ascending again to the outlet. True, it will fall into the room if it is cold air, but it is then apt to cause draughts; if it is warmed before entering, it will not fall, and is likely to cross the ceiling to the outlet, without doing much good on its way. Our most decided and deliberately formed opinion is that the point at which to introduce fresh air into a room is a few feet, about 4 ft. or 5 ft., above the floor. Whether cold or warmed it has then the best chance of mingling with the air of the room, and at the same time of displacing and assisting to drive up the vitiated air, which, as we have before said, once up at the ceiling, should never be tempted to descend again. This we stand by as the proper system in regard to the points of introduction and removal of air. Introducing the air at the floor level is not in itself objectionable when the air is artificially warmed, but it is not so easy to warm it artificially, by the fire at least, for that level as for a higher level, and then there is the drawback that in summer, when the artificial warming is not in action, there will be draughts along the floor, and in fact that there ought, in that case, to be two inlets, one for winter and one for summer; whereas the inlet higher up will answer equally well in both cases.

Taking the instance where air is admitted without being warmed, we want in that case to have it introduced in such a way as to avoid direct draughts near its entry. This is what is effected by the much-vaunted vertical tubes which are now everybody's panacea for the production of efficient ventilation, but which have the drawback of sending the air too decidedly in a stream up to the ceiling, and of being harbouring-places for dust and dirt, and very difficult to clean or inspect. This has been so far recognised that canvas strainers, in the form of inverted cones, have been fitted to the tubes to prevent the influx of air bringing up dust and dirt; but this does not facilitate the cleaning of the tubes any the more. All the advantages of these so-called Tobin tubes are attained, without their peculiar disadvantages, by Stevens's drawer inlet ventilator, exhibited by the firm bearing the very big title of the "Universal Ventilating, Sanitary, and Engineering Company." This provides for the direct admission of fresh air through a strainer, and then between thin metal plates bent upwards so as to deflect the current upwards. The whole forms a metal box in the wall, and the inner portion can be easily removed for cleansing the interior. There is a ventilator nearly similar to this exhibited by Sharp & Co., but the Stevens's is the best. To be sure, the air will not do all that the patentees assert; it will not rise in so marked a vertical column as from the tube (which, however, is an advantage, though the patentees seem to think it is just the other way), and the air will not "gently warm as it ascends." Air is not so accommodating as that, and people who deal in ventilating machinery ought to know better than to talk such nonsense. The only sense in which the air can be said to "warm as it ascends" in such a case is that it gets mingled with the heated and vitiated air, which it ought not to do until it has been used by the inmates, and therefore it is desirable not to drive it up in columns to the ceiling, but merely to give it a little deflection upwards at entering, which is what this ventilation will do better than the Tobin tube. In fact, the patentees have done injustice to their own article in their indiscreetly-worded prospectus, which claims for the ventilator a power which it does not possess, and which it is the better for not possessing.*

* There is hardly any more absurd kind of literature, when one takes a quantity of it together, than these ventilating prospectuses, in which every man roundly asserts

Another method of introducing cold air, so as to neutralise or reduce draught is that of Mr. Ellison, who introduces air through a conical opening, widening towards the room, so as to disperse the draught. This acts very decidedly in the model shown, and acted upon by a pair of bellows; but we cannot say it is quite conclusive to us against the possibility of a distinctly unpleasant draught through such an opening. Mr. Ellison's "air diffusers," which are to some extent a further application of the same principle, are very serviceable, and have the merit of very neat appearance in a room. We doubt if they are better practically than Stevens's inlet, but they are better in appearance.

Mr. Banner's system of ventilation of sewers by means of an inlet acting in continuation with an outlet is fully illustrated by models, showing the form of the inlet, and the two forms of extract cowl, of which the revolving one is an original invention; the fixed one resembles in principle others that we have referred to. There can be little doubt that this system will keep sewers clear of stagnating unwholesome gases. It is like turning a stream of clean water through a muddy channel, carrying away all impurities with it. One or two other exhibitors show schemes on the same principle which seem to be pretty evidently copied from this one. While speaking of the purification of foul air we may call attention to one device, which is to be seen in another part of the exhibition, in the shape of an "artificial lung," designed for the purification of foul air, especially under such conditions as occur in the Underground railway. This is a kind of large network of tape depending from a tube filled with a solution of caustic soda, with which the net is saturated by capillary attraction, and the alkali in the water absorbs all carbonic acid and sulphur gases as the air passes through the net. The author gives a section of an air-purifying wagon containing a series of these nets, which is supposed to be pushed before each train in the Underground railway, and computes that thus all the air in the tunnels may be kept in a purified and healthy state at the expenditure of about one shilling per train each trip. It would be an interesting experiment to see tried, but we confess to feeling rather sceptical as to the result.

To return to house ventilation. In the class of ventilating systems which are assisted by artificial heat, there is a very original and apparently effective one patented by Mr. Pritchett, already briefly referred to in our pages, and especially designed for hospitals. This consists of a hot plate of two thicknesses of corrugated metal with hot water circulated between them, and which is applied to the wall behind a movable dado, and draws up a current of air behind the wall hangings, which are arranged so as to fall back slightly as louvres, opening upwards, and the warmed air is thus admitted in two or three layers at different heights on the wall; near the ceiling a similar but smaller heated wall-plate acts as an extracting force. The wall-linings in this case are Rees's patent metal tiles, offering a thin movable and washable wall-covering. In the model we can testify that the draught acted admirably, and the same system of corrugated hot-plates is applied by the patentee in one or two other methods of heating. It is a new and apparently a practical and practicable idea. Waller's hospital ventilating apparatus, in which ducts for both hot and cold air are carried along each floor, and can be opened or closed, or hot and cold currents mixed in varying proportions, in the neighbourhood of each patient, sounds very well in description; but will the hot and cold currents, entering the same apartment at the same place, be so obedient to direction as is anticipated? We have some doubt of it. Weeks's admirable hot-water coil, in which air is drawn up through the centre of each column in the coil, has been before commended in our pages, and is one of the simplest and most efficient combinations of warming and ventilation, as far, at least, as inlet is concerned; and it may act as a suitable inlet, in a kind of multiple Tobin-tube form, even for cold air, when the coil is not heated. Messrs. Verity's ventilating and warm-air apparatus, more in the ordinary stove shape, draws up warm air mechanically (by their patent screw-propeller) through a spiral coil of pipe which is heated by a central stove, but which receives the heat through a layer of water so as to avoid the unwholesome effect of air from an overheated metal surface. This also, by means of the propeller, will act as an inlet for cold air when the fire is not lighted.

On the whole, the exhibition shows that we are supplied with several good, and, in some cases, inexpensive, systems of combination of warmth and ventilation, in all of which hot water is the immediate agent for conducting heat. The utilisation of gas for heating purposes is, however, a very important branch of the subject of warming, as, if electricity, as seems very probable, take the place of gas for lighting, there can be little doubt that gas will be largely utilised as a heating agent, a function which it unfortunately fulfils at present, too often, in a way which is not desired. There are two or three comparatively novel ways of utilising this kind of heat which are worth notice for their ingenuity. Mr. Pritchett's "portable air-warmer" is, in the specimen exhibited, warmed by an oil lamp, but would be equally applicable to gas. It is simply a small collection of hollow metal chambers or tubes arranged vertically in a compact circle, and containing water which is heated by the lamp below. There is also an attempt to utilise the spare heat which does not pass into the water, by carrying it down in a descending flue to the level of the floor again, where it finds its way into the room through a strainer, which is supposed to keep back the more noxious products of combustion. This, however, it does not accomplish, as the "smell of the lamp" is very perceptible in the neighbourhood of the return tube, and would by little and little pervade the room. The heat saved is not worth this disadvantage, and the apparatus would be more satisfactory if the flue carried the products of combustion clear away. Ritchie's "Lux-calor" gas stove does profess to provide for this to a certain extent; it burns gas in a closed tube in front of a metal radiator, within which the gases from combustion are condensed and find their way as a liquid into a receiver below. Ventilation tubes for the supply of warmed air also pass up through the apparatus, discharging vertically at the top. The patentees show good testimony as to its innocuous use in green-houses, which is a strong test, but we fear the manipulation of the light would prove some little difficulty to servants. Schönheyder's patent sanitary stove, exhibited by Strode & Co., is a very clever thing, as a combination of light, heat, and ventilation. It is a tall columnar-shaped circular metal stove, with a gasburner about 5 ft. from the floor inclosed in a globe outside the stove. The fresh air rises through the lower part of the stove, passes by a duct through the gas lamp, feeding it and passing off through a flue up the centre of the stove, warming the air in the upper part, which then circulates in the room and is removed by an extract at the floor of the room. This is against our principles, and we doubt the satisfactory working of the extract, in all conditions of the room, but the apparatus does get a great deal of work out of one gas-light, and is very cleverly contrived. It should be understood that the gas and its products are entirely shut off from the atmosphere of the room. A drawback to it is that it is a large and by no means ornamental object in a room, though it might be made more pleasing to sight by decorative treatment. This question of the sightliness or unsightliness of apparatus for warming and ventilation not unfrequently obtrudes itself. Many of them might be much less ugly than they are with proper treatment, but the ideas of manufacturers and patentees on this subject are most original. One patentee tells us his extract-cowls "constitute an architectural ornament." We are much obliged to him, but we respectfully differ. Another, wound up to enthusiasm in the description of his own stove, observes that "the appearance is even more agreeable than the drawing indicates, as it has a handsome brass rim round the projecting part at the top." A handsome brass rim,—think of that! The most exacting "æsthetic" must be content!

Among the appliances for warming only irrespective of ventilation, the grates are mostly such as are known to those interested in such matters, and have been referred to and described in our pages before. Comparing the show of grates here with the immense variety of contrivances for utilising the fireplace in the best or supposed best manner which we met with in M. Planat's large work on heat and ventilation, which was reviewed in our columns some time since (vol. xxxix., pp. 663, 685), we cannot but feel emphatically how little this part of the show comes up to the profession of being "international," and how many suggestions and contrivances have been made in fireplaces of which there is not a hint here. There are Mr. Edwards's grates, which are known to our readers, and which are very good as economical heating grates; there is the "wonderful" grate, the patentee of which, perhaps, claims a little too much for it; there are several reversible grates, contrivances which we think have had their day and the advantages of which are somewhat illusory. Deane's open grate for burning anthracite as well as common coal is a good one; for anthracite there is a special draught created by closing the register door, when the products of combustion are conveyed down side flues and under the fire, and the greater part drawn through the fire again and "consumed"; this until the anthracite has got into a glow, when the register-door is opened and the grate operates in the ordinary manner. As to the working of this special draught on first lighting the anthracite we cannot speak from observation; but we did see anthracite burning in the grate, without smoke, which destroys the erroneous superstition some persons have that anthracite will only burn in a close stove. In fact, anthracite may be burned in a much simpler stove than Deane's. Steven's steam and hot-air heater deserves mention as a very economical and rapid manner of heating a coil (low pressure) to a moderate degree of warmth. The firebrick stove with terra-cotta gills communicating with a hot-air chamber, exhibited by Messrs. Rosser & Russell, shows a great amount of heating-surface for the space it occupies. There are few things, however, that show any speciality of principle worth comment. The grates are mostly more or less satisfactory applications of well-recognised principles, showing in many cases excellent workmanship. Once for all, however, firebrick backs will not last.

FURTHER NOTES AT THE MEDICAL AND SANITARY EXHIBITION.

RESUMING our notice* of the appliances and materials displayed in the International Medical and Sanitary Exhibition, we deal this week with the exhibits in the Eastern Quadrant, taking the stands in numerical order.

At Stand 351, Mr. C. W. Durham, of Chicago, U.S., shows the "Durham system of house drainage," which is described by the exhibitor as an application of the practice of gas and steam engineering to the construction of house drains. Under it, the water-closet system of a building is constructed as a distinct apparatus, independently of walls and floors for its support. A trapless water-closet (of any make) is described as being an essential feature of the system, "securing an uninterrupted flush of water" and "abolishing the disagreeable and indecent trap feature of ordinary plumbing." The full-sized model shown is, we are told, to be taken as a sample of construction only, and not of ventilation. In practice, it is sought to secure a thorough circulation of air through the pipes, which, by the way, are of cast iron with screw joints. The system is stated to have been largely introduced in the Western States, and to have been adopted for all the buildings in "the new manufacturing city of Pullman, Illinois," where two thousand brick dwellings are now in course of erection.

Mr. W. Ramsey (Stand 352) is an exhibitor of Jewell's "improved system of drainage and ventilation," including a double syphon disconnecting trap in stoneware, this trap being arranged with one water-seal above the other. The arrangement is compact, and is worth the attention of visitors. The "Priestley" drinking water tank (Ramsey's patent) is another speciality worth looking at. The cistern or tank is lined entirely with plate glass, and a glass ball-valve is used with it, so that the water stored in the cistern is not in contact with lead or any other metal. The same exhibitor's coloured glass leaded window-blinds are cheap and effective, and most of them fairly well designed. Their non-absorbent nature, and the readiness with which they can be cleaned, are important sanitary advantages.

The capabilities of "Spence's Metal," artistically and industrially, are shown at Stand 354,

* See p. 101, *ante*.

that his ventilator does everything, and no other is of any use at all. This is what Captain Marryat would have called "flap-doodle," which he defined as "the stuff they feed fools with."

where, besides a number of busts, is shown the application of the material for making air-tight joints to iron soil-pipes. The material, as our readers already know, is largely used by gas companies for the joints of their mains.

Mr. F. W. Clark (Stand 355) exhibits in action a portable gas apparatus for lighting and heating purposes. The gas is obtained from a hydrocarbon liquid known as gasoline. The apparatus and its product are well spoken of by architects and others who have used them.

The "Otto Silent Gas Engine," now so well known and so largely in use as to need no fresh commendation, is shown by Messrs. Crossley Brothers, at Stand 357.

Mr. James Wood (Stand 358) shows some handy commodes and disinfecting vessels for the sick room. They are exceedingly light, and their contents can be discharged without offence or risk of contagion by nurses or servants.

Stand 360 is occupied by Messrs. Bellman & Ivey, who have a good display of their scagliola marble, which, apart from its decorative value, is possessed of a non-absorbent and washable surface, and hence its use will be commended by the sanitarian.

Some concrete specialities are shown by Messrs. Charles Drake & Co., at Stand 361. Among them we may mention as specially worthy of notice a "marble concrete" bath, cast in one piece, and polished on the surface. The makers claim for this bath that its material and construction ensure perfect cleanliness, with, at the same time, a pleasing decorative appearance ("Marble concrete," we should say, consists of concrete with small chips of marble embedded in it, so as to give the surface an ornamental effect. It is capable of taking a moderately high polish on the surface). Other exhibits of this firm possessing a sanitary as well as a constructive and decorative value are the "mosaic marble jointless concrete pavement," in one slab 8 ft. by 6 ft., with Grecian scroll and border lines in red, black, and white marble concrete; and mosaic marble hearths, wall-tiles and slabs. The firm also show their method of monolithic concrete building and fireproof flooring. This stand, like many others we have named, merits more than a passing glance.

Concrete in its constructive applications is shown by Mr. Alfred Walker at Stand 362. A speciality of this exhibitor is his "granite and iron slag concrete," which has been largely and successfully used for warehouse and stable floors, railway platforms, footpavements, carriage-drives, &c. Many architects and railway engineers have used these materials, and they have given great satisfaction. The iron slag concrete forms a good fireproof floor by completely encasing with it iron girders and joists. Mr. Walker's concrete sewer culverts, made either in sections with lap joints, or in one piece, are well worthy of notice. At the same stand is shown Phillips's "Reversible Window," which consists of an arrangement of the ordinary window-sashes so as to permit of their being completely cleaned, painted, or repaired, from the inside.

The Eureka Concrete Co. (Stand 363) are exhibitors of warehouse and stable floors, sewer culverts, &c., and of Nichols's patent arrangement for laying gas, water, and other mains so as to prevent roads or pavements being disturbed when such mains require repair or renewal.

The Wortley Fireclay Company (Stand 365) exhibit earthenware pipes fitted with Jackson's air-tight, gas-tight, and water-tight joint, suitable for either sewer or water-pipes. They are also exhibitors of some good glazed bricks, white and coloured, made of Leeds clay.

Mr. T. J. Constantine (Stand 366) exhibits his "hot-air radiating and coal-economising slow combustion 'Treasure' stove," and his "Treasure" cooking-ranges; very good.

At Stand 367 Mr. William Hellier shows his water-heater, for domestic purposes, and the same apparatus in conjunction with a coil for heating purposes. Either gas or hydro-carbon oils can be used for the heater.

The Anthracite Coal Company assert the sanitary value of their smokeless coal at Stand 368.

Stand 372 is occupied by Messrs. Quirk, Barton, & Co., with specimens of their patent tin-lined lead-pipe, for preventing lead-poisoning in water, beer, and other liquids. The thin inner casing of block tin is so firmly united to the interior of the lead pipe that no amount of contortion or twisting appears to have the slightest tendency to separate the two. This piping is drawn complete at one operation by special machinery, the lead and tin being firmly pressed together and united in the process. A useful material exhibited by this firm is their thin laminated sheet lead, for preventing damp coming through walls.

Mr. Joseph Constantine (Stand 374) shows his patent "Convoluted" stove for warming churches, chapels, and other large buildings,—a very good one.

Mr. Robert H. Griffin (Stand 375) shows a register stove designed to be smoke-consuming and to admit fresh warmed air to the apartment in which it is used. It is constructed to burn coal, coke, or anthracite. Some remarkably strong testimonials in its favour have reached us.

Messrs. S. Leoni & Co. (Stand 376) have a number of gas-stoves and kitcheners on view; also hot-plates, ironing-stoves, &c.

At Stand 377 Messrs. Faraday & Son are exhibitors of some very good ventilating and other gas-fittings. By simple means they seek to carry off direct from the burners the deleterious products of combustion.

Dr. P. Hinckes Bird (Stand 378) exhibits his simple and costless means of natural ventilation, first described by him in the *Builder* many years ago. They are unpatented, and any one is free to use them. In many instances their use would be more effectual than that of one-half of the more elaborate contrivances since put forward.

The Silber Light Company (Stand 380) show a number of burners so devised as to get a maximum of illumination whether with gas or oil.

Messrs. Gillow & Co. (Stand 381) are exhibitors of lavatories, specially designed for a limited space, and made of earthenware and walnut.

Mr. C. R. Stevens (Stand 383) exhibits his patent "Steam and Hot-air Heater" for warming buildings. It has many good points to recommend it. A small quantity of water is kept supplied to the copper reservoir above the gas or lamp inside the iron casing, by a supply cistern with a regulating ball-valve, or by a self-acting reservoir with stand, which is connected to the heater by a pipe, and, when lighted, the heat causes the small quantity of water to be turned into steam, which is driven through the pipes, an outlet being provided for the escape of the steam at the top. Stevens's circulating water-heater, for supplying hot water to baths, hand-basins, sinks, &c., is also worth the attention of visitors.

Mr. Thomas Lloyd (384) exhibits a working model of a new patent "shut-up staircase or steps," which may be lowered or raised at pleasure, with the view of gaining or cutting-off access to factories where the precious metals are worked; it would be very useful in many situations. It is the invention of Mr. Ernest Day, architect, Worcester.

At Stand 385, Messrs. Gilmore & Clark show their "Autothermarkon," or self-heat-ruler ventilator, and their "induced-current" air-brick; but their speciality is a recently patented chimney-cap, called the "Scientia," which should be looked at.

Drs. Hayward and Drysdale, of Liverpool (Stand 387), show a large model, illustrating their system of self-acting ventilation by suction power, of which we have before now spoken.

Mr. James Howorth exhibits, at Stand 388, his well-known Archimedean screw and other ventilators, which are favourably known and have been largely used.

Ventilators are also exhibited at Stand 389 by Messrs. C. Kite & Co., who show, among other kinds, a speciality which has been approved by the Metropolitan Board of Works for cowshed and stable ventilation.

Stand 390 is held by the Universal Ventilating, Sanitary, and Engineering Company, who show Stevens's "Exhaust" and "Drawer-Inlet" ventilators, and Stevens's "Exhaust" chimney-tops. They have all been noticed by us on previous occasions.

Messrs. Comyn, Ching, & Co. (Stand 391) exhibit Thomas Boyle's patent ventilators in various forms. They have been long before the public, and are of proved efficiency.

Bullivant's "air-tight and noiseless" sliding sash-window is exhibited at Stand 392. It appears to be simple and efficient, and has been used by many well-known architects.

The "Anti-Accident" sash, exhibited by Mr. Robert Adams (Stand 395), is somewhat similar in principle to that last mentioned, and is well worthy of notice.

Messrs. Smith & Turner (Stand 397) show Ben Turner's patent adjustable regulating door-spring (largely known and widely used), and other appliances of the kind, including an improved water-bar for French casements. A useful article shown by this firm is Hughes's fountain clothes-washer, which is placed upright in the washing copper or boiler and causes the water to circulate over and through the clothes as long as the water boils.

The "Filtre Rapide," a useful appliance for industrial and domestic purposes, is shown by Mr. P. A. Maignen at Stand 401.

Messrs. Matheson & Gardner (Stand 403) are exhibitors of lead-incased block-tin pipes for water.

Messrs. Benham & Sons (Stand 410) have one of the best and most useful displays in the exhibition. Their "Anglo-German" porcelain stoves are an English improvement on the German porcelain stoves, inasmuch as they are sold complete, ready for fixing, instead of requiring to be built up and fitted together tile by tile, on the spot. The external surface is entirely of glazed enamel. The well-known ventilating globe light, for gas, made by this firm, is shown fitted-up. A disinfecting oven or chamber, heated by gas, and a chamber for the same purpose in which steam is either admitted directly in contact with the articles to be purified, or which is heated by admitting the steam between the jacketed sides of the chamber, are shown. In the one heated by gas, iron plates are provided for spreading the heat, and on these plates sulphur or some other fumigating agent can be used. A hospital ward kitchen-range, with oven, boiler, hot-plate, &c., heated by coal and gas combined, or separately, is likely to be very useful. When the fire has been let out, the gas can be used for the hot-plate. An interesting exhibit is the series of articles of hospital furniture made by this firm for the Evelina Hospital for Sick Children, Southwark. Benham's hospital slop-sink, as used at the Radcliffe Infirmary at Oxford, is worthy of the attention of visitors. Their ventilating kitchener, the "Davey" washing-machine, a centrifugal wringing-machine or "hydro-extractor" for laundries, and Dr. Siemens's improved gas-fire for burning anthracite, are other items in Messrs. Benham's interesting and valuable collection of exhibits.

At Stand 411, Messrs. Chorlton & Dugdale show an exceedingly handy contrivance under the name of the "Sunlight" stove. It is compact and convenient in arrangement, and will cook for a large number of people. By the simple addition of a coil inside the stove, a supply of hot-water for baths, lavatories, &c., can be obtained. The coil can be readily detached at any time, the stove being workable either with or without the hot-water apparatus.

The well-known firm of Musgrave & Co., of Belfast (Stand 412), exhibit their patent slow-combustion stoves and air-warmers, which have undergone several improvements, especially in the mode of feeding. They will burn for from eight to twenty-four hours without attention. Another speciality shown by Messrs. Musgrave is the patent "Ulster" smokeless stove grate. It somewhat resembles a register stove grate, but is provided with a chamber, fed from above the back of the fire, for holding fuel. As the fire burns away, it is replenished by the fuel contained in the chamber, but the fuel so stored cannot become ignited until it reaches its proper position in the fireplace. The heat of the fire causes the fuel contained in the chamber to part with those constituents which form the heavy smoke passing into the chimney every time an ordinary fireplace is fed with fresh coal, but in this stove they are made to pass through the fire and to be consumed. Any coal, and even slack, can be burned in this stove.

Mr. Francis Hammond (Stand 413) shows a ventilating globe gas-light and other gas apparatus.

At Stand 414 Messrs. Weeks & Co. show their excellent "hydro-caloric" coil (which we described and commended not long since), together with their patent "economical boiler," with super-heating tubular furnace-bars, and a vitiated air-extractor applicable to the cornices of rooms.

At Stand 415, Mr. R. Renton Gibbs shows in a very complete way his patent system of heating by means of hot water. His apparatus, in its simplest form, consists of an endless metallic

tube of small diameter, through which there is a rapid circulation of hot water. A portion of the tube is coiled up, so as to surround and contain the fire, and the remainder is disposed in the way most convenient for the attainment of the end desired. Mr. Renton says that experience has demonstrated to him that only one size of piping is required for all classes of apparatus large or small, and he has found that the most convenient dimension for the pipe is $1\frac{5}{16}$ in. diameter, outside measurement. Mr. Gibbs's system has been largely used by architects and others, apparently with much satisfaction. In Mr. Gibbs's "hot-water grate," a coil of pipe is fitted to an ordinary sitting-room fire-grate, forming a boiler in itself, and yet preserving the cheerful appearance of an open fire. The bars themselves are hollow, and form part of the coil. By means of this grate it is asserted that three or four bedrooms may be warmed from the dining-room or study fire. Mr. Gibbs also exhibits his "air-cleansing prisms," for hospital and other windows. The prisms are in reality merely V-shaped troughs of glass carried horizontally and close above one another across the window opening. Water is admitted from the top of the window into the top trough, whence it passes through a narrow slit in the form of a thin film or sheet into the trough below, and so on until it reaches the bottom of the window, where it finds an outlet. The prisms or glass troughs form a kind of louvre, and the air passing between them when the water is running is cooled and cleansed.

Messrs. Verity Brothers (Stand 416) exhibit in action their patent ventilator or air-propeller, capable of being easily applied wherever there is a cistern, the fans which propel the air being actuated from a fly-wheel which is driven by two pin-hole jets of water. Messrs. Verity also show their patent combined fan and screw exhaust ventilating head, actuated by wind-power. This ventilator has been adopted for the meeting-room of the Royal Institute of British Architects, Condnit-street. The same firm exhibit a patent ventilating and warm-air apparatus, and the "Osborne" combined boiler and coil,—the latter heated by gas.

Messrs. Frederick Edwards & Son (Stand 417) show their "New Smoke-Consuming Slow-Combustion Grate," the invention of Mr. Frederick Edwards, jun. In it Mr. Edwards adopts the principle of putting a body of coals sufficient for a day or a night's consumption into a fire-basket or chamber, making a fire in the common way on the top of the body of coals, and allowing the coal to burn gradually downwards until the whole is consumed. This principle is substantially the same as that adopted in Dr. Arnott's grate, and in the modification known as the "*Builder* Fire." We are told that it also resembles, in some particulars, a grate patented by Mr. Goodchild, an architect of Guildford, in 1857. We have not space to describe it in detail. It should be seen and examined by visitors. By its adoption Mr. Edwards maintains that the following advantages are gained:—(1) A practical immunity from smoke. (2) A fire that will burn from morning till night or from night till morning, with little or no attention. (3) No chimney-sweeping, except, perhaps, once in ten years. (4) No coal-scuttle required except at the time of lighting the fire.

George's patent "Calorigen," in two forms, for coal or gas, is shown by Messrs. J. F. Farwig & Co., at Stand 418. The "Improved Patent Slow Combustion Calorigen," for warming and ventilating, will burn for twelve hours without attention. The improvements embodied in it are important, and calculated to render it increasingly useful.

Stand 419 is occupied by Messrs. R. W. Winfield & Co., who exhibit metallic bedsteads, cots, and furniture applicable for hospital and general use. They have a good display of domestic brass-work, in the shape of fenders, fire-screens, and spark-guards, and a large show of lamps, brass chandeliers, and gasfittings generally.

Messrs. Thomas Potter & Sons show at Stand 420 the "Thermhydric" ventilating hot-water open fire-grate, the invention of Mr. H. Saxon Snell, architect, by whom it has been applied in several of the large parochial and charitable institutions which he has erected in the metropolis and elsewhere. It has on more than one occasion been described by us. Exhibited by the same firm, and devised by the same inventor, is a smoke-consuming revolving fire-grate. It is so constructed that the grate or fire-cage containing the coal or other fuel is made to revolve upon a pivot in such manner that, when fresh fuel is placed upon the top of the fire, it is, by the inversion of the grate or fire-cage, brought undermost, and thus the products of combustion are more perfectly consumed than in the ordinary open fireplace. The working parts are few in number and simple in character.

At Stand 422, Messrs. Hobbs, Hart, & Co. exhibit, besides safes and iron doors for various purposes, numerous specimens of locks, lock furniture, and fittings, adapted for asylums, hospitals, and buildings generally. This firm, as usual, maintains its position.

Messrs. J. L. Bacon & Co. (Stand 423) exhibit their well-known hot-water apparatus, which consists of an endless circuit of wrought-iron tubes of special manufacture, $1\frac{1}{16}$ in. in external diameter, and $\frac{7}{8}$ in. thick, the ends of which are provided with right and left handed screws. They are connected together by means of sockets (also screwed right and left hand), which draw the ends together and force them one into the other, thus making a strong and sound joint. A portion of the circuit of tubing, built into a furnace at the lowest level, supersedes the ordinary boiler. This method of warming is convenient and economical, and hence it has been, and will continue to be, largely adopted.

Several ingenious novelties are shown by Messrs. Archibald Smith & Stevens at Stand 425. First and foremost we must name the "Wonderful" Grate (Russell's patent), which was fully described not long since at a meeting of the Royal Institute of British Architects, as reported in our columns at the time. It is smokeless, and burns anthracite coal, coke, or cinders. It is self-feeding; the fire is always bright; the intensity of the fire can be regulated at pleasure, the fire will burn for twenty-four hours without attention, and it has other advantages which must be seen to be appreciated. The stove is shown in action in the Exhibition. A cheaper form of the stove is made and shown, no doubt quite as effective as the one of which we have been speaking, but not so sightly. This defect in the appearance of the cheaper form of the stove will, it is to be hoped, be remedied. Russell's patent "Binate" door furniture, exhibited by the same firm, is the very embodiment of simplicity in this direction. The pair of knobs are made in one solid piece, and by a very simple and efficient arrangement, are keyed on to the door by the insertion of the lock, so that the lock would have to be taken out of the mortise before the knobs could be removed. The same exhibitors show the patent weather-tight "Janus" fastening for French casements, their anti-friction door-stop, and a weather-tight sill-bar. All these appliances are good and useful, as is the "Janus" adjustable door-spring, with regulator top-centre.

Messrs. Strode & Co. (Stand 426) are exhibitors of sun-burners for gas, and of electrical apparatus for lighting gas. They also exhibit Mackenzie's electric lamp, and their improved gas-regulator. A novelty shown by them is Schönheyder's "Patent Sanitary Stove," which seeks to light, heat, and ventilate a small room at one and the same time. Gas is the heating and lighting medium. Fresh air is drawn in from the outside of the house by a special inlet, and this is warmed by passing through the body of the stove, which is in the form of a pillar, some 5 ft. or 6 ft. high, the argand burner used for lighting the room and for heating the stove branching out some 5 in. or 6 in. from the face of the pillar, into the interior of which the products of combustion are conducted and utilised for heating purposes.

Stand 427 is in the occupation of Messrs. Rosser & Russell, who are exhibitors of a variety of good and useful heating and ventilating apparatus. One of their exhibits is the "Leopold" reversible grate, which will, it is asserted, consume its own smoke, and burn for eight hours without attention.

Messrs. Deane & Co. (Stand 430) are exhibitors of Crane's patent register grate, which we lately noticed somewhat in detail. It is claimed for it that it burns anthracite as easily as ordinary coal, that it effects a great consumption of smoke, and that it thoroughly ventilates the room in which it is used, thus combining the heating powers of the close stove with the healthiness of the open fire-grate.

The exhibitors of the "Radiator" cooking-range (Macphail's patent), shown at Stand 431, claim great things for it.

Messrs. J. Defries & Sons (Stand 433) show their "granulated pumice-carbon filters," in various forms and sizes.

The Sun Auto-Pneumatic Lighting and Heating Company (Stand 436) exhibit their "Sun" gas-making machine,—probably the best apparatus of its kind. It is largely used for churches, mansions, and other buildings which are at a distance from gasworks.

Messrs. Woollams & Co. (Stand 439) are exhibitors of some good wall and ceiling papers, which, being free from arsenical and other poisonous colours, are worthy of notice by sanitarians, and, indeed, by the public generally.

Messrs. Thomas Bradford & Co. (Stand 441) exhibit their well-known washing machinery, now to be found in many large and well-appointed laundries.

Parquet-flooring, impervious to dust or dirt, is shown by the well-known firm of Howard & Son at Stand 442.

We have now made mention of all the principal appliances and materials exhibited in the sanitary section of the exhibition, but before concluding we may call attention to a map exhibited in the Western Gallery (No. 80) by Mr. Henry Newman (late City Surveyor, Winchester) and Mr. S. J. Newman, A.R.I.B.A., Northampton, showing a scheme for providing London and other places in the Thames Valley with a good supply of water. It is proposed to collect the water from the highest portions of the Thames water-shed, where it is believed that a good supply of pure water may be obtained comparatively free from the contaminations and impurities found in surface or river water if taken or collected at low levels. It is proposed to bring the water to London by conduits or tunnels kept at convenient depths below the surface, save in some places where it would come to the surface of the ground, the Northern tunnel terminating at Chipping Barnet Common on the north of London, and the Southern tunnel, between Merstham and Gatton. From reservoirs at each of these points it is proposed that the water should be conveyed in iron pipes to suitable points for connexion with the present mains, so distributing the water by gravitation throughout London and suburbs. In its completed form the scheme would make provision for the supply of water to every place requiring it within the Thames water-shed.

The Exhibition will remain open until the 13th of August; and we urgently recommend our readers to visit it.

BIRMINGHAM AND ITS TRADES.

ONE of Whittier's tenderest poems happily hits off Birmingham. Speaking of Joseph Sturge, he adds that the city of that good Quaker's love was "swinging its clamorous iron flail." Few can visit that great mart, manufactory, and mouthpiece of the Midlands without learning that large as is the opinion that it has of itself and of its value, that opinion is justified; for it is one of the chief of our British wonders. Its name is supposed to tell of the broom that grew plentifully near it in the past. It is claimed that it was an important town before the days of the Romans, to have manufactured arms; as Elihu Burritt puts it, some have believed that they made tools for Cornish miners in the days of the Phœnician traders; that the scythes for the chariots of the ancient Britons were here made; and that the "lineage of its iron and copper workers runs back to Tubal Cain without a break." But in any case, the records of the town from the days of the Conquest to the reign of Charles I. are few. In the Civil War, the people of Birmingham were on the side of the Parliament, and brawls and battles were known in it. In later days, the anniversary of the French Revolution witnessed those riots in which Unitarians and Priestley suffered; and beyond these, till the days of Attwood and of later political leaders, little is known of the great town but its steady growth and the development of its wonderful industries. Peace, law, and order became the motto of Birmingham, and trade has been its ideal.

It is wonderful to look at the town now, remembering what it was forty-five years ago. It had grown from the small town,—with one street "a quarter of a mile long," as Leland describes it,—even then, to one noted for its public spirit and its vast works. The carriageways were generally "formed on Mr. Macadam's principle, but many of the footpaths were uncomfortable, being paved with small stones." The water-works had been recently established; the town-hall, just completed, was "as chaste and magnificent a building as any erected in modern times." The "new market-hall" was completed, and

many of the improvements in Birmingham were in course of being carried out. At that date the municipal concerns were overlooked by one hundred commissioners; the officers of the town were high and low bailiffs, and a chairman of the court leet, whilst two constables and a headborough survived. The first two members of Parliament had just been elected. There were ten churches, many dissenting chapels and other places of worship, whilst the philanthropic institutions were comparatively numerous. The population of the town,—4,000 in 1690, and 73,670 in 1801,—had risen by 1831 to 146,986. It was, in the words of Burke, the "toy-shop of Europe," but, as we shall see, a wonderful one: firearms, buttons, buckles, iron, gold, silver, pens, glass, copper, and brass, were amongst its productions and the materials it worked with. At that day the post-office was at "Bennett's-hill, New-street"; there were nine bankers, six of whom survive now; three newspapers,—all weekly; two gas companies, and a water company. Almost countless numbers of coaches left the Swan and Castle, the Swan, the Albion, the Castle and Saracen, and other inns; columns of carriers fill the pages of the old directories; there were fly-boats and packets by water, but apparently the railway was not, and the directory then runs to seed in a dry list of names of tradesmen and manufacturers in countless industries. There was energy and activity in the town in those days; public spirit of a high order, and a determination to seize on and to make the most of all the advantages that the position of the town or the multiple benefits flowing from the possession of coal and other valuables near it could give it. And it is to that desire, to that public spirit, and to that energy in trade and in corporate matters, that the proud position of Birmingham is now due. Some of the ancient orders of the town have passed away, but newer and more popular bodies have arisen to do corporate service, and watch over and advance with a rare fidelity and devotion the public interests of the growing town. The town of Watt, of Boulton, and of Priestley, has not stood still; indeed, it may be questioned whether the advance has been so great and so continuous generally in the case of any other of the great centres of population. As a great town it is a young one, and hence it has not much to show of the ancient in its buildings, but it has, in place of these, the evidences of public spirit, of wealth, and of abundant taste.

The great town-hall, which has been called the "most symmetrical and classical building in England," with its powerful organ; its fine grammar-school, its colleges, schools, hospitals, stations, and churches, the council-house, and some of the great warehouses and workshops, attract attention, and attest the fact that, of late, Birmingham, whilst regarding utility, has also had an eye to architectural beauty. But it is as a manufacturing place and as a mart that it first claims the notice of the visitor, for it is this that stamps its character primarily upon it. Its trade is great in nuts and nails, in tubes and tins, in tools, pens, bolts, guns, electro-plate, wire, stoves, heating apparatus, bedsteads, and the countless varieties and forms into which iron and steel are shaped. In the days of Hutton it was said that Birmingham was "small in her size, homely in her appearance, and coarse in her dress, her ornaments being of iron from her own forge." It has been greatly changed since that day, but perhaps the greatest of the changes that have been known is that of her industries. It was said a few years ago that the glass trades alone gave employment to 1,500 persons; that buttons claimed the labour of 6,000 more; and that the extent of the gun trade and its labour needs were indicated by the fact that, in three years, there were turned out for the British Government not less than 231,000 stands of arms, and upwards of one million for other powers and persons. Birmingham is not one of the chief centres of the heavy iron trades,—it could scarcely, with its present position, be one of the great producers of pig-iron, for instance, —but in the use of iron and steel, in the production of "toys" of one class or another, and in the production of many of the chief of our daily requisites in steel and iron, it is still the market of the world, and, to some extent, the manufactory also. The two leading firms in the bellows trade, for instance, often send out 500 dozen weekly in the autumn; of one class of axe alone, one maker sends out 2,000 dozen yearly; of iron wood screws the two principal makers can produce 300,000 gross weekly,—an almost incredible number; one firm in the nut and bolt trade employs 3,000 persons; and at one establishment 1,000 cheap clocks have been made in a week. At the Proof House, about half a million barrels are proved in the year; the weekly production of wire birdcages by one firm is a thousand; whilst pens are produced by the great makers at such a rapid rate that they are counted by the million and gross of millions. These figures may be said to be in some degree illustrative of the development of many of the industries in Birmingham; and in galvanised iron, in tinplate, stamped and japanned wares, in almost every manufacture of the metals, from the presents for the "little stranger" to the coffin-plate that records a death,—for every age and for almost all circumstances, Birmingham is the mart if not always the manufactory. It has coal and pig-iron near it; it has manufactures in and all around it; and it has a population which has the inherited skill in manufacturing operations of many centuries, so that it is not to be wondered at that it has attained and still retains greatness, and that it has built up for itself a trade that of its kind has no competitor so great. It is the variety and the extent of its trades that prevents it feeling depression to the same extent that some other towns do, such as Sheffield, for instance, in the periods of dulness in the iron and steel industries. And it is a somewhat singular fact that from that district it obtains some of its raw material, converts it into manufactured goods, and sells the latter at such a price as allows of no competition, even on the part of the town from which it obtains the raw materials it so manipulates.

But Birmingham has a soul above buttons, to use an appropriate simile. Its Town-hall, the Institute near, and the College and the Council House, are proofs of the public spirit it possesses; whilst Aston Hall and its grounds, with other of the public parks, show that the dwellers in the iron town have a longing for more than the mere show of stately buildings; and the investments in lands for the welfare of the people are noble proofs of public spirit rightly applied. And though it is needless to give the figures, yet it cannot be forgotten that the great works of public improvement that have been carried out by the Corporation of Birmingham are works that will for all time stamp with credit the councils that planned and executed them, and the citizens who incurred the cost for the adornment and the general improvement of their town. In that poem of Whittier's, to which we have referred, there is mention made of "the smoky veil" of Birmingham, and though it remains, and is likely yet to remain, there has been something done to render it endurable to those whose circumstances force them to remain "in populous city pent." We have glanced at the growth of the great trades, and it may be said that if the manufacturers of Birmingham are true to themselves there will be further growth. It is true that there is greater competition, and that Birmingham does not hold a monopoly of the manufactures of the world. But it is also true that the uses of iron and steel are growing, and the wants of the people must be supplied by those who produce best and cheapest. It may be that in some parts of the cost of production there can scarcely in Great Britain be a reduction, but in others it is possible. There has been of late an abnormal growth in taxation, both local and imperial, which must be not only checked, but there must be also an immense reduction, so that our manufacturers may be better able to compete with great nations that are becoming manufacturers, and that are not burdened with heavy taxes as in Europe. There must be a readiness also to adapt the style and form of the production to the needs of the user,—even to his whims,—and there must be also a cheapening of the cost of production with an improvement of the quality. With these, and possibly with the reduction of the cost of transit, the position of Birmingham should be improved. The coal and iron near it, the many villages and towns that in the iron and steel trades contribute to its commerce, the hordes of industrious workmen, and the enterprising merchants, should make it a greater town in the future than it is in the present. The sun has not set on our manufactures yet, nor will it if our vast capital and our great labour can be more firmly united to meet that international competition which seems setting in, especially in the metallurgical industries and the metal trades.

DULWICH COLLEGE GALLERY.

IT was but the other day we were conversing with a friend who remembered well the removal in 1814 of the famous collection of pictures which now form the Dulwich Gallery from the house of his neighbour, Mr. Desenfans, in Charlotte-street, Portland-place, where the pictures had reposed for some years in the possession of the Royal Academician, Sir Francis Bourgeois. Desenfans, whose memory is, we imagine, scarcely sufficiently associated in the public mind with the Dulwich Gallery, had collected at the close of the last century a number of pictures for the then king of Poland, Stanislaus. This worthy king, however,—whose character Carlyle, in his "Frederick the Great," has amusingly sketched off in his most summary manner,—did not "come to his own," leaving the collection on the hands of Desenfans. A sale dispersed a large number of the pictures, but the remainder, considerably added to, he left on his death to his wife and his old friend, Sir Francis Bourgeois. It is to Sir Francis Bourgeois that the formation of the Dulwich Gallery is usually attributed, and with justice; the claims of his old friend, Desenfans, and the actor, John Philip Kemble are, however, deserving, as we have already remarked, of more recognition than they generally receive.

Sir Francis Bourgeois, with a wisdom and liberality entitling him to take really the first place in the ranks of the promoters of the fine arts in England, was very desirous to carry out in every point the wishes of his unusually sympathetic friend Desenfans, whose scientific knowledge of art convinced him that without its immediate influence a technical knowledge was unobtainable. To this end he had warmly impressed on Bourgeois the importance of the gallery being retained if possible in London,—in fact, on the very spot in which it had been carefully brought together; but on Sir Francis applying to the then Duke of Portland with a view to the purchase of a reversion in fee of the three houses occupied by him in Charlotte-street, in order that the collection left him by Desenfans might become a permanent exhibition, the Duke did not approve, even if he were certain that he had the power to sell the reversion of his estate in "Marybone," as he writes it in his curt and ill-spelt reply to Sir Francis Bourgeois.* It was at this point that his friend Kemble suggested, with characteristic sympathy for the old Elizabethan actor, Edward Alleyn, that the pictures should be left to the masters and fellows of God's Gift College, Dulwich. Sir Francis, by ample pecuniary bequest, left sufficient to add a wing to the College; the then popular architect, Sir John Soane, the famous architect of the Bank of England, was employed to erect the pleasant gallery with which so many of us are but too little familiar, and which really forms one of the most perfect and charming small collections of pictures in Europe.

Sir Francis Bourgeois died, and, not long after him, Mrs. Desenfans. That lady, in conformity with the wishes and known intentions of both her husband and her old friend, in her will bequeathed the sum of 500*l.* to the Dulwich College for the purpose of fitly entertaining, on their annual visit, the President of the Royal Academy and the Academicians; and, like a practical and worthy housewife, she further desired that "in order that the said annual dinner may be properly and suitably given, I do hereby bequeath the following articles to the Master, &c., of Dulwich College, which I direct shall be preserved by them, and never be used on any other occasion, for any other purpose whatsoever, viz., three dozen of silver plates, with the arms of Noel Joseph Desenfans, esquire, engraved on them; a silver bread-basket, with ditto; four dozen of silver forks engraved with his crest; one dozen of silver spoons ditto; six salt-spoons ditto; a large silver waiter; two small ditto; three dozen of ivory-handled knives, the blades steel and plated; a complete dinner-service of china dishes; a dessert-service of five pieces, with two dozen of plates; a large mahogany dining-table with table-cloth; four plated bottle-stands, with decanters and glasses; a mahogany press with shelves and drawers to be placed in an ante-room containing the above articles." Mrs. Desenfans left in addition a number of pieces of furniture, "a sofa and ten chairs covered with green

* See the correspondence in appendix to the new and excellent catalogue of the Dulwich Gallery.

velvet; two commodes with drawers inlaid with brass and tortoiseshell; two ebony tables with gilt legs"; a French clock, with many other interesting objects immediately connected with the annual dinner, which, for sufficiently good reasons, she wished should be changed from St. Luke's day to the second Saturday in May, or "any other more convenient day of that month in every year." Need we say that the somewhat incongruous pieces of furniture that occupy the last room of the gallery are the same that Mrs. Desenfans specially mentions in her will?

Of the curators, Mr. Denning, who succeeded Mr. Cookburn, is, perhaps, the best known. As an artist his name is familiar to a few sincere lovers of art and the fewer favoured collectors of English works, but above all to the rapidly dying-out band of professors of the great art of the engraver,—artists who have added so many triumphs to the history of English art. To Denning we owe not a few of the famous engravings of modern times.

It is at Dulwich, and especially it was so thirty or forty years since, when people did not go abroad as much as they do now, that the English art-student first becomes acquainted with the charm of Velasquez as a portrait-painter; years ago we believed that at Dulwich we could study at least two Velasquez: we now learn and are correctly informed, as enlarged experience shows us, that the smaller Dulwich Velasquez is but a reduced copy of the original at Madrid; but although this is clearly the case, the comparison with a memory of the original and this copy years ago is exceedingly instructive. From the second picture, a genuine Velasquez, the portrait of Philip IV. of Spain, we are able to form a tolerably perfect judgment of the extraordinary art of that great Spanish painter, whose rapidity and certainty of execution were so wondrous that Sir Joshua himself, in referring to him, said that Velasquez did at once what it took him (Sir Joshua) many hours and many failures to approach.

Notwithstanding that we have pronounced the collection at Dulwich to be one of the most perfect small collections in Europe, its perfection consists in the rarity of specimens of about thirty or so painters, almost entirely belonging to the later schools,—perhaps the only really fine Italian picture being no earlier than that of Paul Veronese, a portion of a work in four parts, all of which, strange to say, are in England, but dispersed in various collections. Admirers of the early Italian art, the admiration for which seems still to be growing as we get a better understanding of the history of art in the period which culminated in so much beauty in Florence during the early years of the fifteenth century, will find but little at Dulwich to study; but at Dulwich are to be seen not only some historical English portraits of the highest importance, but many exquisite Dutch pictures full of instruction and leading to inquiry on the most interesting artistic questions. One of the treasures of the Dulwich Gallery is the "Fête Champêtre," by Watteau, superior, probably, to any of the Watteaus of the Louvre. It is one of those fascinating little compositions of the master in which are gathered together a number of his most graceful male and female figures dressed and grouped with that delicious artistic artificiality that forms the very essence of the painter's Louis Quatorze style, with its charm of sentiment and exquisitely contrasted and harmonising colour. To those even who know foreign collections well, the Dulwich Gallery reserves in this little canvas a true pleasure. Copies, and contemporary copies, are to be found scattered in many collections at home and abroad, but no eye after seeing this Watteau can ever mistake, when met again, the hand of this charming illustrator, almost director, of the coquettish *fêtes* of the French monarchy in its naughtiest days. Not even the brilliant burin of Scotin could render the tone of this most happy of the creations of the painter who, if he had not like the former passed many years in London, we must never forget was a guest for some short time of art-loving Dr. Mead, in his old house in Great Ormond-street.

Notwithstanding the accumulated memories of great pictures and great masters that most of us as we advance in life have now the opportunity of looking back to, the famous Murillos at Dulwich hold precisely the great reputation that they have long possessed, and we look upon them still, after seeing many other Murillos, with the admiration that the work of all great masters seems to secure throughout all changes of fashion or advance of information.

Among the very representative collection of Dutch masters, the admirers of their characteristic art have always found at Dulwich a broad field for study, and though acquaintance with the Continent, and particularly the land of their origin and the wonderful collections it contains of pictures by its painters, affords much startling and pleasant instruction, the Dulwich Gallery cannot be said to cease to offer interest to the lover of Dutch art. One picture, labelled Gerard Dow, a well-known work, is, undoubtedly, in our estimation, not the work of that artist; the catalogue, it is true, expresses a doubt, and suggests the possibility of the painter being the one we should name, and we are almost confirmed in our belief by recognising the lineaments treated in the same broad manner, very unlike Dow's, of the old woman who served as the model in the equally famous picture by Nicholas Maes which hangs in the La Caze collection at the Louvre.

Dulwich Gallery has long shown its portrait by Reynolds of Mrs. Siddons, the familiar portrait in the grandiose action which tradition states was the result of a happy accidental pose of the painter's statuesque model; but among the many replicas of this familiar representation of the great actress the Dulwich copy cannot be said to stand high; if it be by Sir Joshua, it is not a good Sir Joshua, and only in the distance as one enters the gallery does it hold out a promise that a nearer inspection undeceives. In their life-like portraits by Gainsborough, beautiful Mrs. Sheridan and her equally fascinating sister, Mrs. Tickell, beam with all the lady-like animation that the painter ever knew how to breathe into the portraits of his sitters; he was in this case fortunate, indeed, in two such charming models as the Misses Linley, who, till they changed their names, turned the heads of the whole of fashion-haunted Bath of a century ago. Lucky, witty Sheridan romantically bore off the elder of the old Bath musician's daughters,—the original, by the way, of Sir Joshua's "St. Cecilia," *—and Tickell carried off the younger, and here the two sisters sit and smile, as we hope they will sit and smile for many a generation yet, to tell us what the poet-sung "toasts" of Bath were like in the old coaching days of George III.

In interesting portraits the Dulwich Gallery is indeed by no means deficient,—portraits that each tell, as portraits ever do, their story; few, however, are more worthy attention than the portrait of Molière, "in the school of Lebrun," the new catalogue tells us; it was formerly ascribed (we know not why) to Carlo Maratti, but if of the authorship of the work sage doubts may exist, of the fact that here we have a real portrait of the French Shakspeare there cannot be a suspicion; they are the same unmistakeable features, though a trace younger, as in the famous portrait by Mignard,—the crowned Molière, *bâton* in hand, a portrait which smiles down from the walls of the actor's *foyer* at the Théâtre Français, in company with many another portrayed representation of the great men that have built up the renown of that world-famed theatre. It is one of the justly-prized treasures of the interesting, and to English visitors to Paris almost unknown, museum possessed by the theatre which in French theatrical annals bears the title of "the house of Molière."

Near this portrait of Molière hangs another theatrical portrait, if not of equal interest to the world, at least so to the English visitor, and above all to the Dulwich Gallery,—the portrait of John Philip Kemble, by Sir William Beechey, a painter who, although he appears in our memory to belong to the last century, lived an honoured life in this, and died at an advanced age as late as 1839. This John Philip Kemble is very different to Lawrence's portrait of him as *Hamlet*, which may be seen at Windsor.

The Dulwich Gallery possesses many other interesting historical portraits. Vandyck, or Van Dijck, as Dr. Richter more correctly names him, is represented, though not by any superlative work,—portraits mostly, however, of contemporaries and friends of old Desenfans and Sir Francis Bourgeois, whose names should, in the memory of every visitor to Dulwich, be associated honourably together whenever his thoughts revert to old Alleyn's "God's Gift" College at still happily countrified Dulwich.

* It has a strange effect to the rare English art-students who may find themselves in New York, to come upon in the United States an important picture by Reynolds, but such is the case in the instance of the "St. Cecilia," a picture purchased by Mr. Lenox at the instigation of the late C. R. Leslie, R.A. The picture now in the Lenox Gallery at New York is the "St. Cecilia" for which Mrs. Sheridan sat. It was one of Sir Joshua's unfortunate experiments.

WESTMINSTER ABBEY, JULY 25, 1881.

WESTMINSTER ABBEY lends itself easily to solemn occasions. Within the last very nearly a thousand years, thirty-six coronations have taken place upon its site, but we cannot hastily venture to state the number of memorable funerals that have added to the great history and the dignity of the famous Abbey. It is time, nevertheless, that other steps were taken in this respect.

Westminster Abbey, St. Mark's Venice, the Colosseum, St. Peter's, and the great Pyramid, three Christian and two pagan works, are probably the five most famous buildings in the whole world; but, notwithstanding the greater antiquity of some of them, Westminster Abbey at this moment holds a more prominent place in the regard of the intellectual world than the older buildings. Never, in the long years that have passed since Westminster Abbey has served the great purpose for which it was conceived and erected, never have the custodians of the sad paraphernalia of its funeral ceremonies, been called upon in the exercise of their duty to express or suppress more their heartfelt sorrow than on the occasion of Monday last, when Dean Stanley was buried. Never, probably, has ceremonial been associated with a wider feeling of grief, and never, perhaps, have the funeral obsequies of an eminent man taken place with so few indifferent witnesses, or so many experiencing a personal interest.

We observed a touching incident as we left the crowded Abbey on Monday last,—a poor working-man, waiting outside with a memorial wreath,—a home-made memorial wreath. He was probably a prizeholder in the late window-gardening contest at the *fête* of which the Dean was, perhaps, seen for the last time by the poor of Westminster,—ready when the great folks had passed on to add his mite to the load of honour.

Apart from the many thoughts suggested by the deathbed of the lamented Dean, his last words, as we find them quoted in the sermon delivered on Sunday last at Westminster Abbey by Canon Farrar, are singularly characteristic of the devoted interest that Dean Stanley throughout his years of connexion with the Abbey took in that hallowed spot:—"The end is come," he said, "and it has come in the way I was desirous it should come. I could not have wished it better. I took to my bed just where I wished to die, at Westminster. I am perfectly happy, perfectly satisfied, and I have no misgivings. In spite of every incompetence, I yet humbly trust that I have before the mind of the nation shown the extraordinary value of the Abbey as a religious, liberal, and national institution."

COMPETITIONS.

Bagshot Church.—Complaints and inquiries have reached us as to the management of this competition. The writers say that "in November last the committee advertised for designs, a short time only being allowed architects to prepare their drawings. Notwithstanding, however, the anxiety displayed by the committee to get possession of the designs, seven months elapsed before the unsuccessful competitors had them returned." No information as to the result was given, and they wish to know, naturally enough, whose design has been selected.

Birmingham and Midland Eye Hospital.—An adjourned meeting of the committee of this institution was held on Friday, the 22nd inst., for the purpose of selecting a design for the reconstruction of the hospital. Six sets of drawings had been submitted by the invited competitors. Those under the motto "Mens tuus ego" received the highest number of votes, and the authors, Messrs. Payne & Talbot, of Birmingham, were appointed to carry out the work.

The Royal Exchange.—The Gresham Committee have expressed their willingness to accede to the wishes of merchants, bankers, and others who lately memorialised them on the desirability of covering the Royal Exchange with a glass roof.—*City Press.*

THE TUNNEL AND INSCRIPTION AT SILOAM, JERUSALEM.

THE Committee of the Palestine Exploration Fund are taking much pains to bring before scholars in this country the best materials for forming a judgment as to the rock-cut inscription to which we referred* as discovered in June, 1880, at the Pool of Siloam. In the recent "Quarterly Statement" are given a transcript of this inscription, an alphabet of Aramaic characters, and articles on the subject by the Rev. A. H. Sayce and the Rev. Isaac Taylor. The *Athenæum* of the 16th July contains a letter on the same subject from Mr. Shapira, who has had the advantage over the English scholars of being able to study both the inscription itself and the German cast of the tablet, made by Dr. Gutke, and who, being himself a Jew, and familiar with Aramaic as well as with Hebrew, is likely to feel more thoroughly at home in the matter then even the most learned English scholars.

The comparison, however, of the translations of Mr. Sayce and of Mr. Shapira only tends to confirm us in the wisdom of waiting for fuller light on the subject. We hope that it may prove possible to photograph the tablet by the magnesium light, and that from the cast already taken, the photograph, and the rock itself, the text may at length be accurately determined. At present this cannot be said to be the case. The courtesy of the secretary to the Fund furnished us, some time ago, with a tracing of the first sketch of the inscription that was sent to England. After giving some little time to the study we came to the conclusion that it was necessary to wait for further information. Nor can it be doubted that this was right. The first word in the tracing is "Dereh." The first word in the new copy of the inscription is "Nekebeh." Mr. Sayce commences his translation, "Behold the excavation. Now this is the further side (or the history) of the tunnel." For this Mr. Shapira writes, "Canal of (U) zziah. He dug the canal and cut the pool (or it is the pool) in Ophe (l)."

It is not very encouraging for the unlearned reader, apt, it may be, to have his doubts as to the "science of epigraphy," to contrast these two renderings of some twenty to thirty letters. Contrary to what might have been expected, it is the translation of Mr. Shapira which makes both the best English and the best sense. On the other hand, this translator seems to have a strong disposition to read what is not to be found in the letters. Thus, of the name Uzziah the most characteristic letter is wanting; and so is the *l* of ophel, which Mr. Sayce reads "olu." We certainly hold with Mr. Neubauer, in the *Athenæum* of the 23rd of July, that it is premature to discuss the various readings until the text be definitely settled.

Equally imperfect, we hold, must be any attempt as yet to fix the date of the inscription on palæographic grounds. Mr. Sayce argues for a date of extreme antiquity, in fact, as far back as the reign of Solomon, from the archaic form of some of the letters. But it is admitted that two forms of the same letter occur in the cases of the *aleph*, the *mem*, the *vau*, and the *resh*. Mr. Isaac Taylor, in the "Quarterly Statement," argues reasonably that it is the latest, not the earliest, form of letter occurring in any inscription that should determine its greatest age. One character, which Mr. Neubauer proposes to read as *zain*, is not to be found either on the Moabite stone, on any Hebrew coin, or in the alphabets collected by Gesenius, Mr. Madden, Messrs. Conder's "Handbook to the Bible," or the valuable book, called "Grammatography." It more closely resembles the Hieratic *cheth* (of Ballhorn) than any other character with which we are acquainted. It will be interesting to know on what grounds it is identified, and what light such identification throws on the date of the character. Mr. Shapira, who has studied both the inscription and the cast, says that "we actually find the strangest forms of letters and ligatures, and one letter in different forms." Mr. Neubauer, who has not seen either inscription or cast, "cautions" his readers "against any idea of ligatures between the letters in the Siloam inscription." This question is not, however, one of opinion, but one of fact; and, of course, eye-witness goes for more than assumption. It should not be forgotten that the Aramaic alphabet is one which has not only preserved its type for an immense period of time, but in which early and apparently long disused forms have reappeared at a certainly determined and later date. Thus the letter *shin* has two types,—one that of the small Greek *omega*, the other that of the capital Roman W. The first occurs on the Sidon inscriptions, about B.C. 800, then, slightly altered on some of the coins of about B.C. 277; and then on the Roman *denarii*, re-struck with Jewish types, as late as A.D. 130. The W form occurs on the Diban stone, and again on the coins. We have as yet no minimum date fixed for the use of Aramaic letters, and if ligatures exist on this inscription, it may be better evidence for a later date than any which exists for the era of Solomon, which was a long time ago.

As to the little drift-way itself, it is not a work of such skill as to render it desirable to commemorate the name of the engineer. The position will be seen, by a reference to the map No. 7 in Conder's "Handbook to the Bible," (p. 335) to tally with the work which was executed by Hezekiah (B.C. 717–688). If Mr. Sayce be correct in saying that the length underground is 1,708 ft., although the straight line above is only 1,104 ft., there would seem either to have been much want of skill in the construction, or otherwise that the conduit formed part of a more general plan, of which we have only recovered this portion. Thus, on any ground, it is desirable to investigate the matter fully.

The "Quarterly Statement" which contains the letter from Mr. Sayce and Mr. Taylor is one of unusual interest. We cannot attempt to give an abstract of its contents,—not that it would do any injustice to the work itself, for it would only make the reader more anxious to study the actual report,—but for want of space. Lieutenant Conder's discovery of the Hittite capital, Kadesh, on the Orontes, known from Egyptian records to be older than the Exodus, has excited extraordinary interest. We hope that funds will be forthcoming in order to ascertain whether the library of the Hittite kings may not prove as enduring as those of the kings of Nineveh and of Babylon. The interest in the Holy Land and its vicinity seems to have been stimulated rather than satisfied by the completion of the great map, and the work carried on under the direction of the committee needs only to be widely known in order to insure any requisite amount of pecuniary support. We commend to all our readers the Quarterly Statement of the Palestine Exploration Fund, for July, 1881.

* See *Builder* of April 9, 1881, p. 456.

NEW DOCK AT LEITH.

WHATEVER may be the attractions that give splendour to the occasion of its opening, the new dock at Leith has an intrinsic importance which needs but little knowledge of the case to realise. The basin which will have been opened by the time that these pages are in the hands of our readers, is the second and the larger of two new docks erected on land reclaimed from the sea. The Albert Dock, covering 10¾ acres, was completed in 1869. The Edinburgh Dock, connected with the Albert by a passage crossed by a heavy stone bridge, covers 16¾ acres. It is 1,500 ft. long, and 650 ft. wide, but its wharfage, or waterside accommodation, is far more in proportion to its wet area than in other cases. A jetty 1,000 ft. long, and 250 ft. wide, projects into the dock from the eastern end, and the form thus given being something like that of the capital letter H, adds a linear measurement of 2,250 ft. or upwards to the length of wharfage. At the west end of the jetty, within the limits of length and breadth mentioned, is a graving dock 300 ft. long. This is a smaller graving dock than that called after the name of H.R.H. the Prince of Wales in connexion with the Albert Dock, which is 470 ft. long; but it will be an immense convenience for any vessel which, having entered the Edinburgh Dock, has need of the service of a graving dock before putting to sea.

The Edinburgh Dock makes the fifth of the wet docks now in connexion with the port of Leith, two of which are on the west and two on the east side of the harbour. Of these the first, known as the Old Dock, was opened in 1806, so that we have in the present area the measure of the growth of three-fourths of a century. How far the trade has expanded in that time there is a want of statistics to show. Since 1840 the total dues received by the dockyard commissioners have risen from 26,012*l.* to 88,330*l.* per annum. Since 1860 the outward tonnage has risen from 483,748 tons to 945,230 tons, and the inward tonnage from 477,400 tons to 940,200 tons. The actual number of vessels entering the port shows a decrease, but this is due to the increased burden of each vessel, and shows very clearly the great advance that has been made within the last twenty years in the size of our mercantile vessels.

The northern side of the new dock is to be devoted to the colliery traffic, which it is hoped may thus receive a new impetus. The chief exports from Leith at the present time are coal and iron. In both of these, however, the last five years show a notable decline. In 1874-5, 296,193 tons of coal, 147,329 tons of pig-iron, and 1,563 tons of malleable iron, were exported. In 1879-80 the weights had fallen to 185,175 tons of coal, 127,207 tons of pig iron, and 1,821 tons of malleable iron. This is the lowest amount of pig-iron for any year of the five. As to coals, 20,000 tons less were exported in 1878-9 than last year, and the malleable iron was also some 700 tons less. There is thus a small increase in these two items as contrasted with the preceding year, but the decline in the staple export of pig-iron has been steady for the whole period, amounting to nearly 40 per cent. between 1874-5 and 1879-80. Grain, the chief import, has increased, although not steadily. In 1875-6 the imports were 1,074,124 quarters; in 1879-80 1,135,127 quarters. In 1878-9 they were only 939,033 quarters. Most of the coal goes to Russia, and the iron to Germany. In face of this declining trade, the spirit shown by the opening of the new dock is the more striking.

GAS EXPLOSION AT CHALK FARM BRIDGE.

THE account which has been given in the daily press of the circumstances and the cause of the gas explosion at Chalk Farm Bridge, on the morning of the 20th of July, is so incredible, that in reproducing it we must do so under reserve, not having had the opportunity of personal verification. It is stated that in the construction of the bridge hollow box girders were introduced between the roadway and the foot pavements, and that "in spite of the protests made against the proceeding at the time of the construction of the bridge, the gas company, instead of running their pipes under the bridge, or through the hollow girders, made use of one of the latter as a portion of the circuit, turning the gas into it at one end, and drawing it out at the other." It is not stated in the account what gas company it is that adopted so fatal an economy. On reference to the map, it will be seen that the district referred to is that of the Imperial Gas Company, the second in order of magnitude in 1874, and subsequently, if we are not in error, incorporated with the Chartered or Gas Light and Coke Company, the eldest of these bodies, which was incorporated by Act of Parliament in 1810. The public will thus have naturally concluded that every precaution known to science was taken by the engineer of the gasworks. Nor is it conceivable how the engineer of the Regent's Canal, or the officer, whoever he was, that was responsible for the construction of the bridge over the canal, would have allowed a portion of the structure to be turned into a gas-holder. In a word, the *pros* are so few, and the *cons* so numerous and weighty, that we write in the full expectation that the detailed statement of the morning journals will be contradicted by the supposed offenders.

But even assuming that a pipe was laid through the girder, the public safety would by no means have been secured, unless there had been a manhole or other means of visiting, testing, and, if necessary, repairing or replacing the pipe. Gas is, to some extent, corrosive in its action, and after a time makes pinholes in, at all events, a certain class of gas-pipes. Again, joints are apt to leak, and when iron is laid on iron, the jar of passing traffic may easily have an accumulative and destructive effect. Any way, it seems that the box-girder was filled with that explosive mixture of coal-gas and atmospheric air, which is so well known to be easily formed if gas is allowed to escape into a closed chamber. As to the exact facts of the occurrence, there seems little room for doubt. The witness and unintentional cause of the explosion, though blown across the road by its force, is said to be, happily, uninjured. This was the lamplighter, who, while cleaning the lamps on the northern pier of the western girder, suddenly perceived a strong smell of gas.

Suspecting a leakage, he proceeded to show that his employers have not taken our advice as to furnishing their servants with a grammar of danger, or a short, clear, explicit set of rules, telling the men what to do and what to avoid in each particular case. Uninstructed on this vital point, the lamplighter proceeded to see whether the mixture was or was not explosive by the simple mode of experiment. Explosive it turned out to be, and before the experimenter could say, "Ha! I thought so," "a terrific series of explosions took place." Happily for those who would otherwise have been the sufferers, the explosion occurred at so early an hour that no one was passing over the bridge. Half an hour later large numbers of workmen would have been passing to their labour. But while this is matter for unfeigned congratulation, as far as the safety of the moment is concerned, it is not so clear that the harmlessness of the occurrence is conducive to the public safety on a broad scale. Had any fatal injury been occasioned,—and it is no thanks to the lamplighter's mode of looking for a leak that it was not,—there would have been an inquest. At such an inquiry it is probable that something rather memorable would have been said as to the plan of turning bridges into gasholders; and at least another opportunity would have been afforded of impressing on those concerned that it is just as prudent to *test* the leakage of a gas-main by the use of a naked light as it is to try whether gunpowder is dry by the application of a bit of red-hot iron. As it is, it is left to us and to a few fellow-labourers to do what we can to call attention to the fact. Meanwhile gasmen will continue to search for leaks with lighted candles until a sufficient number of explosions have thus been caused to impress the explosive nature of gas on the minds of those who deal with it.

From the report of the proceedings of the St. Pancras Board of Works on the 21st July, it appears that the girder was actually used as a gas-pipe. An agreement was produced, which recited that the gas company were to keep the girders in proper repair and gas-tight, and that in the event of failure to do this, the Vestry had the power to put an end to the concession. On the face of this, it would seem that the combination of girder and gas-pipe is a bit of vestry engineering. It will be interesting to know who originated so novel a design, and what are the arguments by which its introduction was supported. The excitement in the neighbourhood, not unnaturally, was reported to be intense, and there is a strong feeling against the continuance of so dangerous a practice. The parish solicitor was consulted. We apprehend that there can be little doubt that the new mode of gas-fitting has received a signal discouragement; still, we are anxious to know who were the authors of the design.

THE TUNNEL UNDER THE MERSEY.

EVEN if ousted, by the marvellous growth of Glasgow, from its former proud position of the second city in Great Britain, Liverpool, in virtue of its 550,000 inhabitants, is still the second city in England. In enterprise and public spirit, moreover, Liverpool has long been held entitled to the boast *nulli secundus*. And as an organised body, or group of bodies, the Town Council and various public authorities of Liverpool have probably more efficiency and intelligence than any other urban authorities in the country, bearing in mind the dislocation existing between city and metropolitan jurisdiction in London, to say nothing of the Conservators of the Thames, the City Commissioners of Sewers, and the various vestries.

Powerful and energetic as Liverpool is, however, it has long been content to be bisected in a very inconvenient mode. In fine weather the trip across the Mersey is not much of an inconvenience, and, indeed, the whiff of salt water thus caught may be welcome to many a hard-driven business man. But weather is not always fine. Days are short in winter. And a steam-ferry over such a river as the Mersey is at times anything but a business-like mode of connecting the docks on either side of the river. What would London say, if some fine morning she should find that her bridges had been replaced in the night by steam-ferries? And the crossing of the Thames is nothing to the crossing of the Mersey.

It is thus remarkable that, although as far back as 1848 proposals were made for a tunnel under the Mersey, it is not until the present time that Liverpool has seriously taken in hand the completion of her organic unity. An agreement has now been entered into by the Mersey Railway Company with the London and North-Western Railway Company for the construction of a line of two miles and a half long that will pass under the Mersey. From a junction with the Birkenhead Joint Railway at Tranmere, the line will run through Birkenhead and under the Mersey, and terminate in Church-street, Liverpool, near the central station of the Midland, Great Northern, and Manchester, Sheffield, and Lincolnshire Railways. That portion which passes under the bed of the Mersey will be about a mile in length, and as far as can be ascertained from a careful series of borings, will be carried through the New Red Sandstone, leaving a sufficient thickness of 25 ft. of rock between the crown of the tunnel and the bed of the river. The works have been contracted for at the sum of 866,000*l.*, of which 216,000*l.* is to be borrowed on debentures. The gross annual receipts are estimated at 140,000*l.* and allowing fifty per cent. for working expenses, the estimated dividend is at the rate of nine per cent. on the share capital of 650,000*l.*

It is estimated that 26,000,000 passengers and 500,000 tons of goods, are annually passed to and fro between Liverpool and Birkenhead. The company have taken credit for half the number of passengers at 2*d.* each, for the whole quantity of goods at 1*s.* per ton, and for the modest sum of 6,000*l.* per annum for parcels and sundries. The nearest railway connexion at present is by Runcorn, a distance of thirty miles. We note that while the preliminary report of the census gives to Liverpool 550,000 inhabitants, the account of the railway project gives 681,936 as the population of Liverpool, and 82,216 as that of Birkenhead. We also observe that the *interim* report on the Scotch census only rates Glasgow at 511,582 inhabitants, instead of the 740,000 claimed for that port a few days ago in the newspapers. We must leave the respective authorities to settle this rather serious difference between them.

THE SPANISH ACADEMY OF FINE ARTS, ROME.

ON the 22nd of May, 1875, there arrived at Rome Count Coello, the Spanish representative to Italy, who, having withdrawn himself for some years from diplomatic service on account of a great misfortune, after hesitating for some months before he returned to that career, was led to take that step by his old and proved loyalty to the Spanish royal house, the grateful recollections of a long residence at Turin, and his friendship with Count Cavour and the principal political men of Italy. These recollections, however, were the more necessary in order to fortify himself in the task he was about to undertake, which was of no easy accomplishment, as it was intended to establish important relations between Spain and Italy. The Government of Victor Emmanuel, actuated by a noble sentiment, had been one of the first in Europe to recognise the monarchy of Alfonso XII., although the wound which had been inflicted on Italian pride, and naturally on the royal family of Savoy, but which had been caused by events in which the Alfonso party had had no hand, was still fresh.

On the morning of the 24th May, when Count Coello had scarcely presented his credentials to King Victor Emmanuel, there appeared before him the aged superior of the Society of the Franciscan Order of San Pedro in Montorio, Father Jeremias, informing him that, on the following day, the agents of the commission of church property of the province of Rome were about to take possession of that old church and monastery, which had been appropriated by the Italian government under the law dealing with ecclesiastical property, and urging him to prevent its sale, on account of its intimate connexion with the Spanish monarchy, as shown by the presence on its walls of the arms of the royal Spanish house of Austria, which fact might be used against the proposed disposal, as demonstrating the original ownership of the building. Moreover, there was found at the door of the small church of Bramante a record of the vow made by the Catholic kings who had erected that temple, another incident which supplied strong evidence as to proprietary rights. Count Coello used his influence with the Italian ministry of the day, in so far as to obtain a delay in the sale of the old monastery, and a respite was thus gained for establishing the ownership. The church of Bramante had ever been prized as the site where St. Peter was crucified; and it possessed, besides, great historic value in the eyes of Spain, as being the temple built by the Roman Catholic kings in fulfilment of a supposed vow to erect a church to St. Peter if the Lord would grant a male child to the Spanish royal family, a child who was subsequently born, and who was Prince Don Juan. The walls are covered with the shield of Isabel and Fernando, and the coat of arms of Felipe II. and Carlos V., which occur about fifty times. A diligent search made in archives and old registers by Señor Don Francisco Aguado, the secretary and archivist of Spanish ecclesiastical buildings, showed on what grounds Pope Sixtus IV., in 1472, had granted, at the solicitation of the Catholic kings, to Father Amadeo the site, much more extensive at that time, upon which the edifice of San Pedro in Montorio is raised. The deed still exists by virtue of which Ferdinand the Catholic, yielding to the prayers of Isabella, who was desirous of a male child, fulfilled the vow made by him by supplying funds for erecting not only the church but also the small edifice of Bramante. The inquiries pursued by Señor Aguado also testified to the struggles which the Spanish monastery from its origin had maintained with those of San Pancracio and San Clemente and the Cistercian Order. Many other documents had also to be studied, all of which proved, however, the perfect right of the Spanish crown to the buildings and the site.

The diplomatic negotiations which followed upon the establishment of the Spanish crown as the owner were for a time interrupted in 1876 by the fall of the Conservative ministry; and when the Depretis ministry succeeded it, a satisfactory treaty was arranged, under which the rights of Spain were recognised, while the susceptibilities of the Italian Parliament were reconciled by the proposition of rearing an Academy of Fine Arts for Spanish students on the ruins, the small edifice of Bramante alone being reserved for a Spanish monastery, in which the holding of religious service is to be permitted for ever. We give a view of the new Academy.

MUSEUM, FREE LIBRARY, AND SCHOOL OF ART, STAFFORD.

IN our present issue we give an engraving of the above building erected by the Corporation of Stafford, from designs by Mr. J. B. McCallum, the borough surveyor. The building covers an area of about 225 square yards. The library and reading-room occupy the ground-floor, the first floor being taken up by the "Wragge" Museum, leaving the second floor for the Art and Science Schools. The building is situated in Eastgate-street, and adjoins the Borough Hall, which provides for the entrance, and is connected on the ground and first floor.

The frontage is composed of red brick, with ornamental designs in terra-cotta, supplied from the Brereton Works of Mr. Arthur Gee, of Stafford, the contractor. The work, which includes some scrolls and medallions in terra-cotta, has been completed by Mr. A. Gee, at a cost, exclusive of the site, of 2,000*l.* The heating apparatus was supplied by the Birmingham Sanitary Association.

CONGREGATIONAL CHURCH SUNDAY SCHOOLS, BROUGHTON PARK.

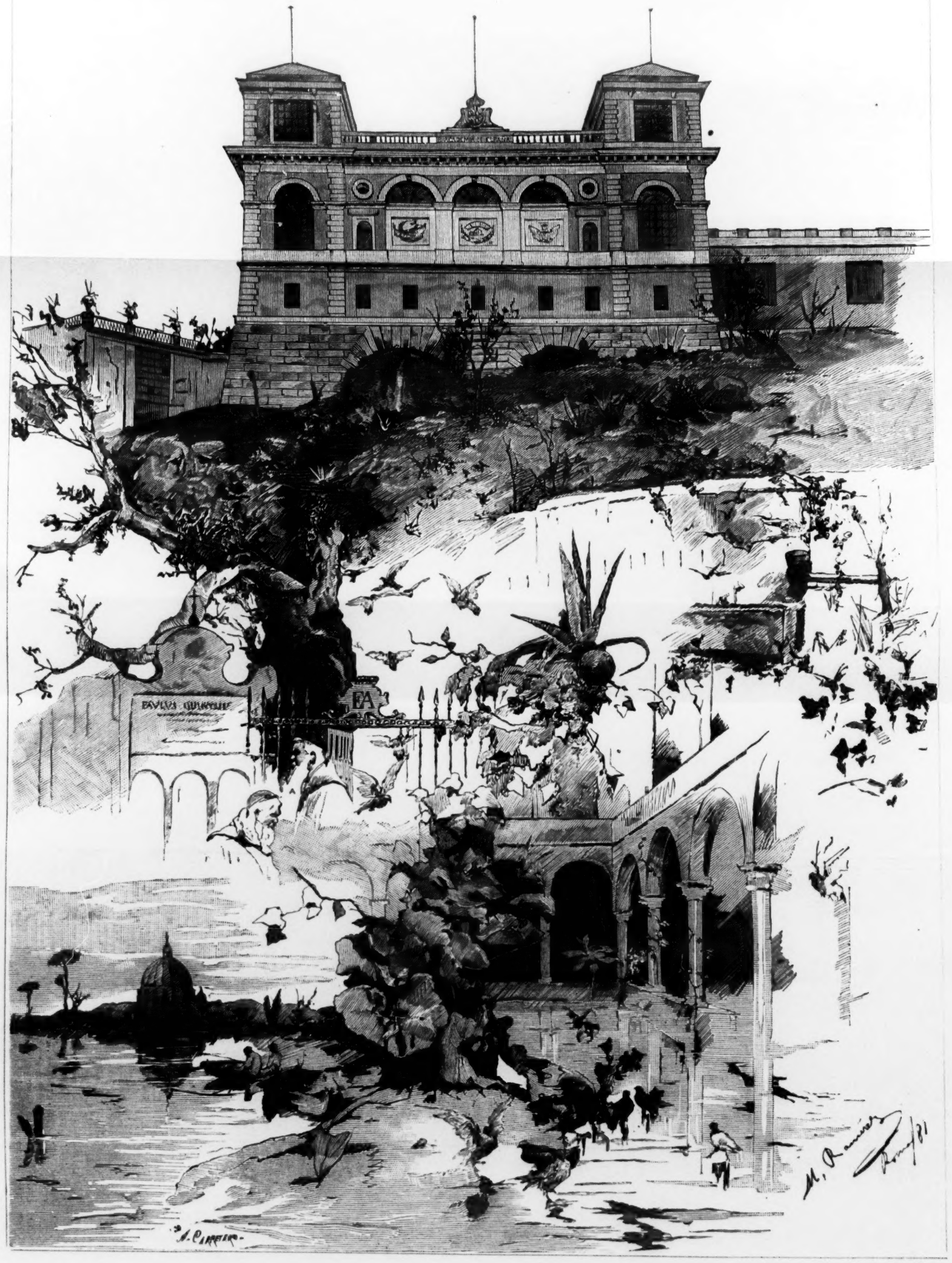
THE new Sunday School is being erected at the entrance to Broughton Park from the Bury Old-road, Manchester, and is designed for 300 scholars.

The large room is 55 ft. long by 28 ft. wide, and 30 ft. high to the ceiling. The whole of the rooms will be heated by low-pressure pipes. A heating chamber, a kitchen, and the other offices are provided in the basement.

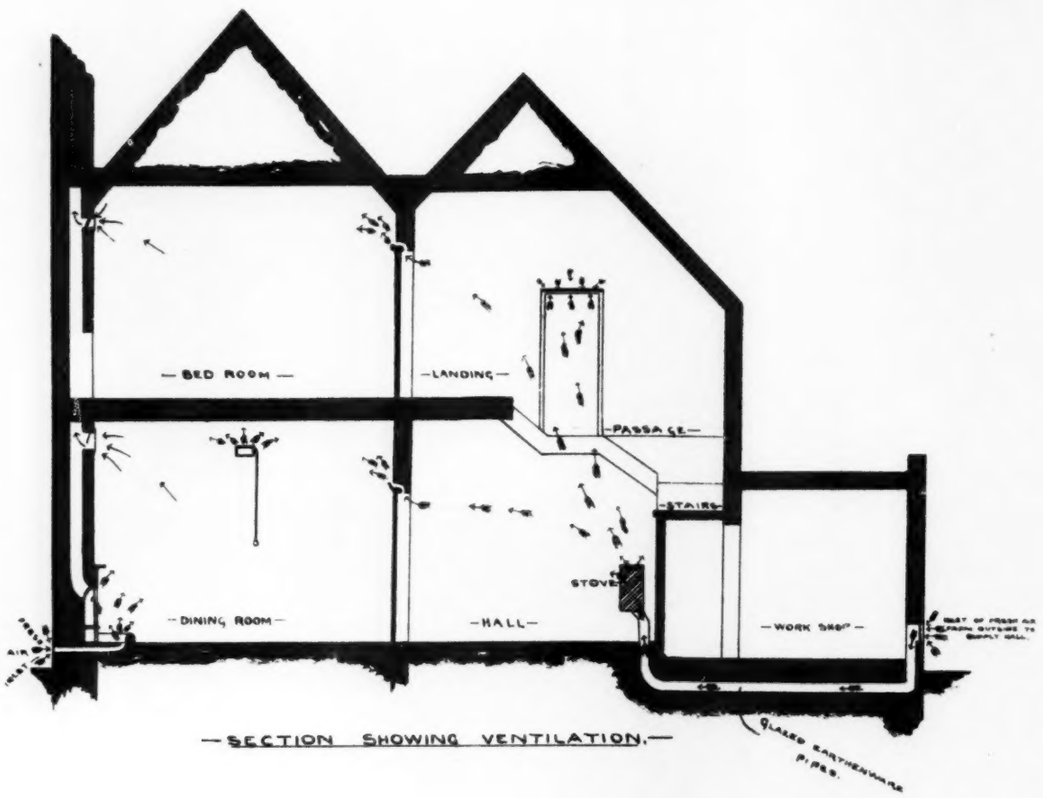
The building, which is of late Gothic character, is faced with Kerridge parpoints, and dressings of Alderley stone.

The work is being carried out by Messrs. W. Southern & Sons, Salford, from the designs of Mr. A. H. Davies-Colley, architect, Manchester.

The Salters' Company.—Mr. Henry Dawson, F.R.I.B.A., is the successful candidate for the surveyorship of the Salters' Company, in succession to Mr. John Collier, deceased. The election took place on the 21st inst.

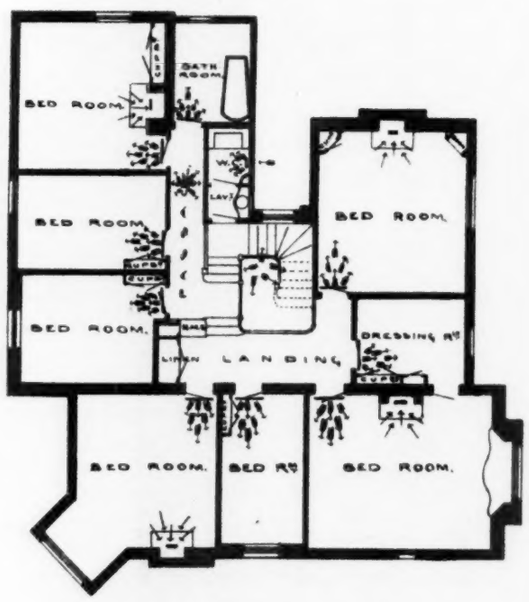


THE SPANISH ACADEMY OF FINE ARTS, ROME.



—SECTION SHOWING VENTILATION.—

—GROUND PLAN.—



—FIRST FLOOR PLAN—

SHOWS FRESH AIR INLETS.

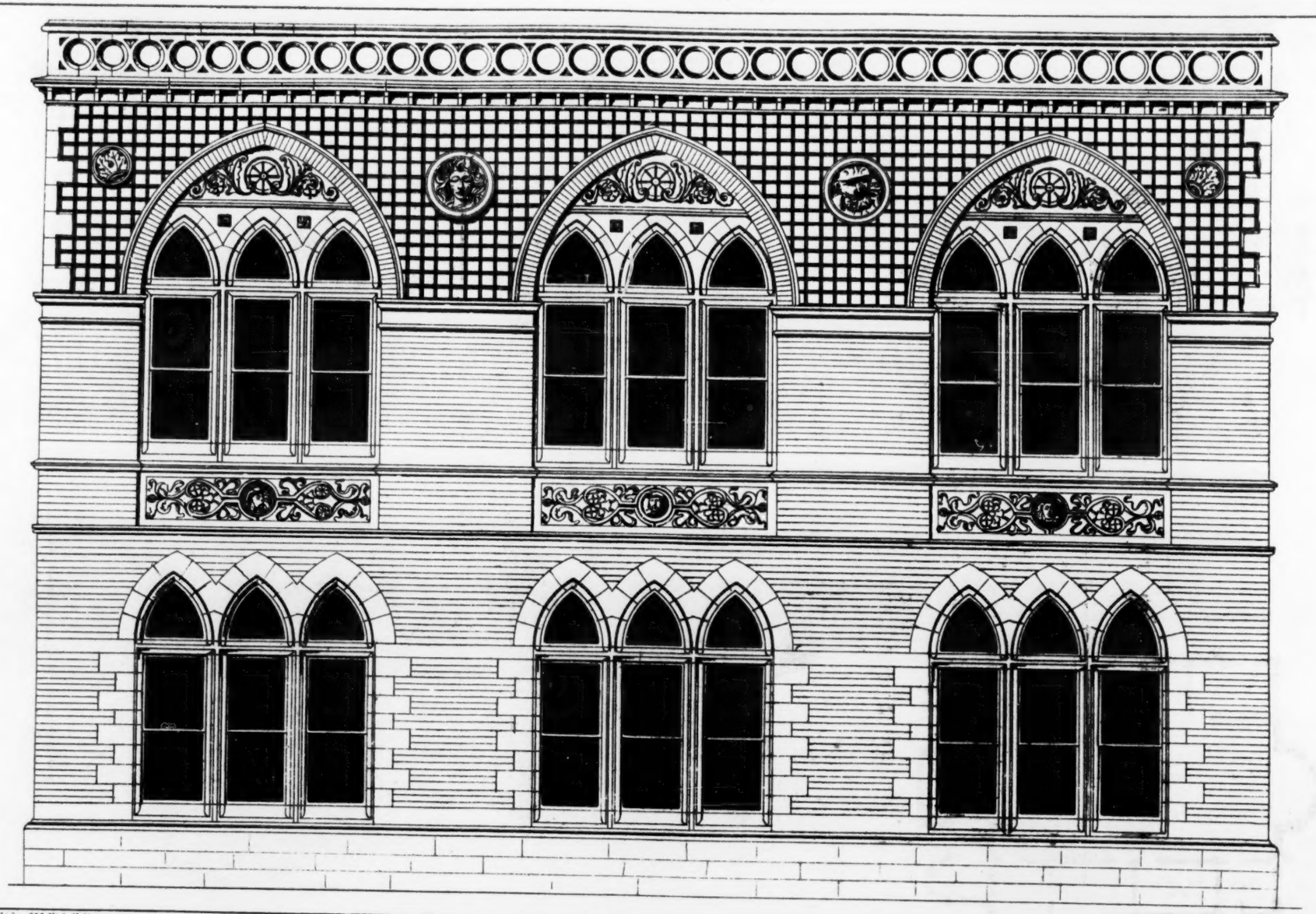
SHOWS VITIATED AIR OUTLETS.

SCALE TO PLANS

— FAIR-OAKS — ADDLESTONE — SURREY — HENRY G. BRACE — A.R.I.B.A. — ARCHITECT —

Whiteman & Bass, Photo-Litho, 256, High Holborn.

Wyman & Sons, Printers, 74 Queen St.

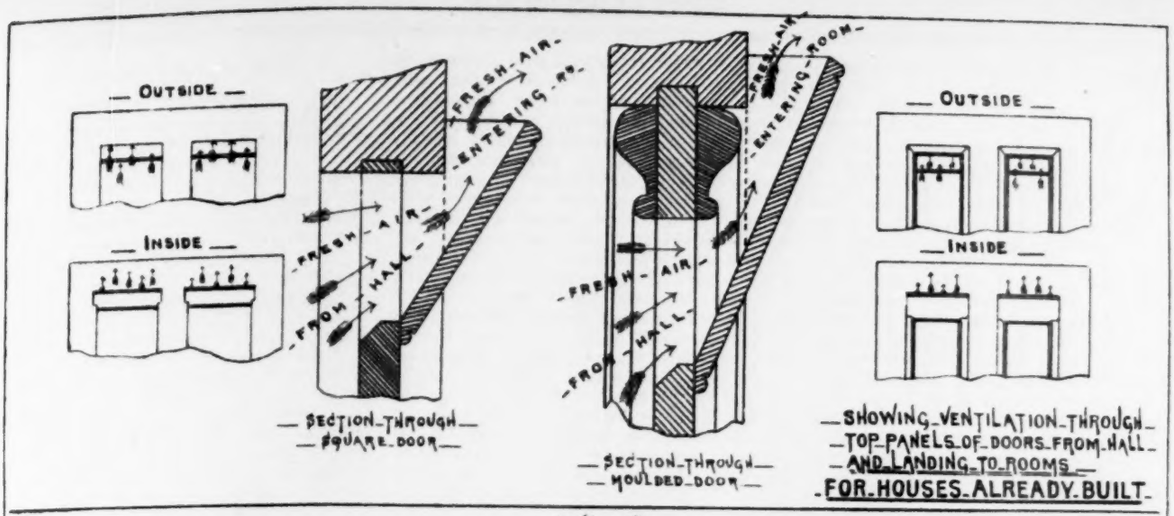


Whiteman & Bass. *Photo-Litho* 236 High Holborn

MUSEUM, FREE LIBRARY, AND SCHOOL OF ART, STAFFORD.—Mr. J. B. M'Callum, Architect.

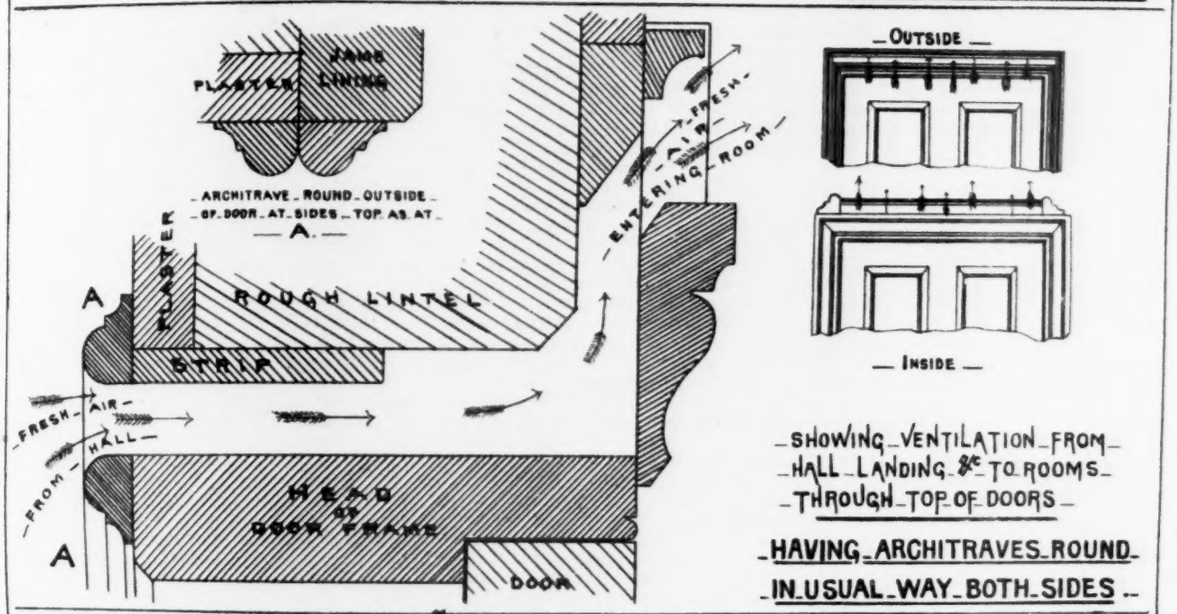
Wyman & Sons, Printers, Gt Queen St

CONGREGATIONAL CHURCH SUNDAY SCHOOLS, BROUGHTON PARK, MANCHESTER.——Mr. A. H. Davies-Colley, Architect.



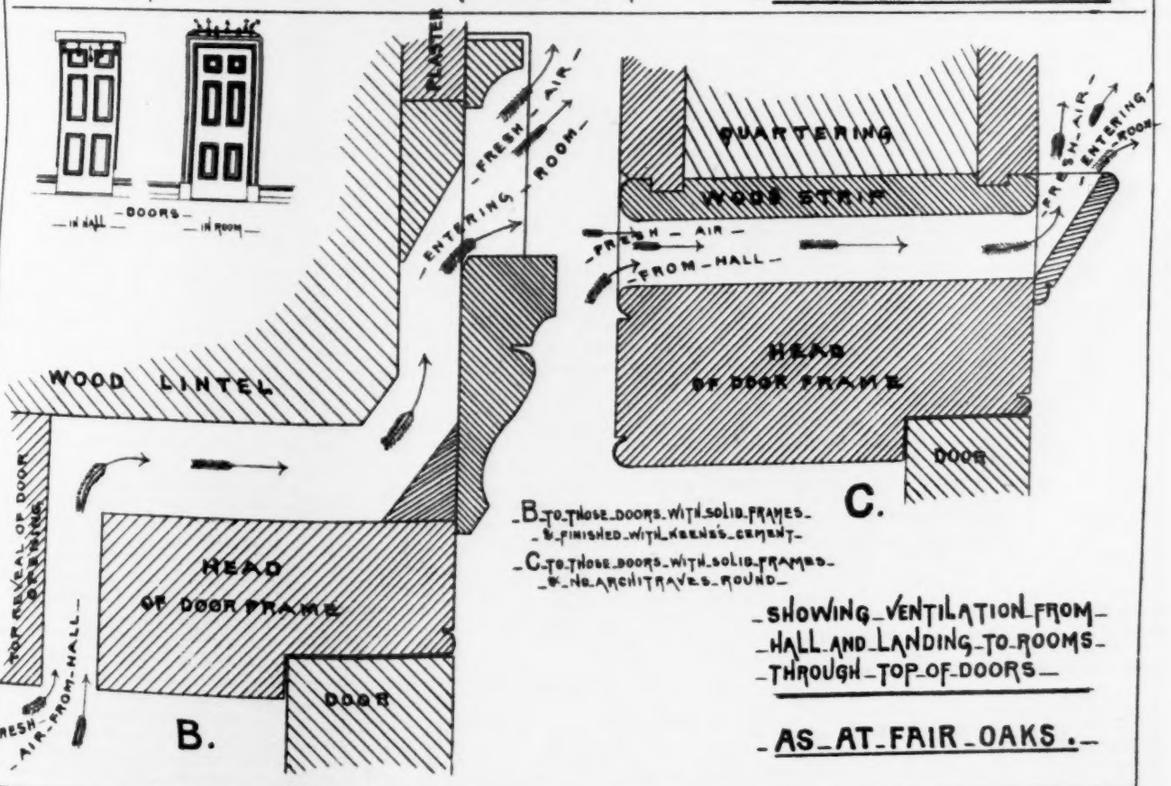
SHOWING VENTILATION THROUGH TOP PANELS OF DOORS FROM HALL AND LANDING TO ROOMS

FOR HOUSES ALREADY BUILT



SHOWING VENTILATION FROM HALL LANDING &c TO ROOMS THROUGH TOP OF DOORS

HAVING ARCHITRAVES ROUND IN USUAL WAY BOTH SIDES



B. TO THOSE DOORS WITH SOLID FRAMES & FINISHED WITH KEENE'S CEMENT

C. TO THOSE DOORS WITH SOLID FRAMES & NO ARCHITRAVES ROUND

SHOWING VENTILATION FROM HALL AND LANDING TO ROOMS THROUGH TOP OF DOORS

AS AT FAIR OAKS.

SYSTEM OF VENTILATION INTRODUCED BY HENRY G. BRACE A.R.I.B.A. ARCHITECT.

Whiteman & Bass Photo-Litho 236 High Holborn

Wyman & Sons Printers Gt Queen St

FAIR OAKS, ADDLESTONE.

ORDINARY VENTILATION.

THE small country-house at Addlestone, Surrey, of which we now give plans and details of ventilation, was built for Mr. John Crowdy (the editor of the *Artist*), from the designs of Mr. Henry G. Brace, 22, Chancery-lane, and embodies points to which both architect and owner have given special attention in connexion with middle-class house architecture.

It exemplifies in plan, as a leading idea, the grouping of the principal rooms round a square hall, which is made an effective internal feature. The staircase is taken into a recess, and treated with a desirable prominence not usual in small houses. Another point is the giving private access to the dining-room from the kitchen department, by a second or serving door.

In the drawing-room is the music recess, by which provision is made for a grand piano and its player. This was a stipulation, we believe, of the owner, and the architect has used it as an opportunity for a pretty effect.

Ventilation is obtained by the cutting of slits in the top of the door-frame, slanting upwards toward the ceiling of the room. These open, in nearly every case, from the hall (a stove in the hall will, when desirable, take the chill off the air), for the supply of every room in the house with fresh air; that is not direct from the outside. The openings are always working, cost but little, and improve the appearance of the top of the door-openings. The reception-rooms are also provided with direct external supply, through Sherringham's ventilator. The vitiated air is drawn into the smoke-flue through a Boyle's ventilator.

It is understood that the currents through the upward slanting slits over the doors result in no draught perceptible to those in the rooms, as the currents entering but at little more than half-way up the height of the rooms and of the width of the door-openings are gently broken up, the air finding its level with the minimum of disturbance.

The external elevation is in red brick, with a very sparing use of stone, and the roofs are of red tiles, while the treatment or style aims at securing a picturesque effect by frankly using modern materials. In the interior much is made in a simple way of the woodwork, especially in and about the hall, staircase, bath-room, and vestibule.

Round the dining-room is a border of tiles; while round the drawing-room and in the bays is parquet-flooring. The morning-room has a wood dado round it, and the floor is of oak. The hall and vestibule are paved with mosaic.

The wall decoration and painting are unobtrusive, but in modern spirit. A treatment of the drawing-room walls and woodwork in two shades of lemon has turned out successful.

SAVAGE ARCHITECTURE.

IN nothing does the savage figure so dimly in an intellectual light as when considered as an architect. Not only is he, in this respect, widely inferior to the civilised man of the lowest grade, but even the beasts of the field, the birds of the air, even flying and creeping insects, seem, in many instances, entitled to claim of him precedence as house-builders. Take the case of the Bushmen of Australia, the Chinook of North America, the stalwart Patagonian, or his opposite neighbour, the elfish Fuegian, and contrast their various abodes with those of the ant, the bee, the beaver, the little harvest-mouse, the magpie, the tailor-bird, the bottle-tit, and a dozen others. Take the magpie's nest, bristling without with such an array of spears and spines that the cunningest of the host of lurking and prowling beasts of prey shall pass it by and make no attempt, or assailing it go whining off with a lacerated nose; but while its outside is so impregnable, the most luxurious baby-basket that riches can procure is less cosy and comfortable within; set this by no means excellent specimen of bird architecture side by side with the filthy hole, swarming with vermin, steaming with pestilential exhalations, with no other inlet for fresh air and sunlight than such a doorway as would discredit a rabbit-warren, and with no more durable roof than one composed of green boughs sluttishly arranged. Set the house of the harvest-mouse, round as a ball, and seemingly as solid, but, nevertheless, with snug interior accommodation for half-a-dozen little blind mice,—though whether the house was first built and the baby mice afterwards thrust in, or the tiny things suspended in the air and the house built round them, no naturalist has yet been found daring enough to give a positive opinion,—nobody knows even how mother-mouse gets at her progeny to feed them, as they hang between the solid walls of their spherical mansion to a pliant corn-stalk. Compare this marvel of mechanism with the lairs,—houses they cannot be called,—a mere handful of saplings stuck into the ground in a circle and tied together at the top, and festooned with reeds, and boughs, and grass,—as constructed by the Fuegian and Andamaner. Compare the admirable work of the beaver with the styish abode of the New Guinea savage! The result of contrast in each case will give rise to feelings, not only of profound humiliation, but also of wonder. How is it that the Bushman, with mechanical skill enough to make him spears and bows and arrows, and invention enough to discover and prepare animal and vegetable poisons with which to tip the latter, making a mere scratch with the tiny thing as certain a forerunner of death as a surely-aimed bullet,—how is it that he does not provide himself and his family with at least a warm and dry place of abode? Truly, he has no conception of the comforts of "home," as the term is applied in civilised countries; still, he is human. "If you prick him he bleeds; if you tickle him he laughs"; and if he lies on the damp earth, with the rain trickling through his bough roof, and the wind whistling in at a hundred chinks, he catches cold, and coughs and sneezes, and becomes afflicted with rheumatism and pulmonary disease, him and his children, who drop from the tree of life like blighted apples. Why does not he alter so miserable a condition of things? Why does not he "go to the ant," or any other of God's creatures around him, and learn wisdom?

It should not be inferred, however, that all savages are as heedless of home comfort as the Bushman and the others of whom he has been taken as an example.

There are races of men who, all their works considered rightfully, bear the appellation of savages, yet have the forethought and industry to build them dwelling-places convenient as their means allow, weatherproof and comfortable, and claiming mention in these pages only that they are highly curious. Most prominent among these are the "Guaraons" of South America. Near to the mouth of the vast River Orinoco there resides a tribe of Indians known as the tribe of Guaraons. They are not a numerous people,—the most modern account numbers them at 8,000,—nor are they ever likely to be, as, from motives known only to themselves, they refrain from associating with neighbouring peoples, and have no commerce with the rest of mankind beyond a very limited trading. The Guaraon has little or no need to engage in barter; his wants are confined to wherewithal to satisfy his hunger, to shield him from the inclemency of the weather, and to enable him to float on the water for fishing purposes. All these wants are supplied by a single and wonderful tree,—the Itá palm. This marvellous vegetable production grows to the length of upwards of 100 ft., and its leaves are so large that one, together with the stalk that attaches it to the trunk, is a load for a man; very few of these leaves suffice for the walls and roof of the Guaraon's house. Besides these useful leaves, the Itá bears a prodigious quantity of apple-shaped fruit, enclosed in which is a nut which, bruised and set to ferment in water, yields a delicious beverage, exhilarating and slightly,—very slightly,—intoxicating. If, however, our savage is inclined "to give his mind to drinking," he has but to tap the trunk of the Itá, and it will yield him a wine that, drank but in moderate quantity, renders him as thoroughly "drunk and incapable" as the most inveterate civilised candidate for a station-house lodging could wish to be. Nor is the wonderful Itá yet exhausted. Its trunk is a meal-barrel as well as a wine-cask, and by splitting its trunk and preparing the pith therein contained, he has a dish that in quality nearly approaches anything that could be concocted from the best sago. Not yet even have all the qualities of this palm-tree been enumerated. To quote the words of Captain Reid,—"The trunk can be scooped out into dishes or cut into spoons, ladles, and trenchers. The flower's spathe also gives him cups and saucers. The bows and arrows which he uses are obtained from the tough sinewy petiole of the leaf; so is the harpoon-spear with which he strikes the great manatee, the porpoise, and the alligator; the canoe, light as a cork, which carries him through the intricate channels of the delta, is the hollow trunk; his nets and lines and the clothes which he wears round his loins are all plaited or woven from the young leaflets before they have expanded into the fan-like flower. Such is the Itá palm. Now for its uses,—the uses to which it is put by the Guaraon. When the Guaraon wishes to build himself a habitation, he does not begin by digging a foundation in the earth. In the spongy soil on which he stands that would be absurd. At a few inches below the surface he would reach the water; and he might dig to a vast depth without finding firm ground. But he has no idea of laying a foundation upon the ground, or of building a house there. He knows that in a few weeks the river will be rising; and would overtop his roof, however high he might make it. His foundation, therefore, instead of being laid in the ground, is placed far above it,—just so far that when the inundation is at its height the floor of his dwelling will be a foot or two above it. He is guided by certain marks upon the trunks of palm-trees, notches which he has himself made in the preceding year, or the natural watermark, which he is able to distinguish by certain appearances on the trees. This point once determined, he proceeds to the building of his house. A few trunks are selected, cut down, and then split into beams of sufficient length. Four fine trees, standing in a quadrangle, have already been selected to form the corner-posts. In each of these, just above the watermark, is cut a deep notch with a horizontal base to serve as a rest for the cross-beams that are to form the foundation of the structure. Into these notches the beams are hoisted, by means of ropes, and there securely tied. To reach the point where the platform is to be erected,—sometimes a very high elevation,—ladders are necessary; and these are of native manufacture,—being simply the trunk of a palm-tree, with notches cut in it for the toes of the climber. These afterwards serve as a means of ascending and descending to the surface of the water during the period of its rise and fall. The main timbers having been firmly secured in their places, cross-beams are laid upon them, the latter being either pieces of the split trunks, or, what is usually easier to obtain, the petioles of the great leaves, each of which, as already stated, forms of itself a large beam, 12 ft. in length and from 6 in. to 1 ft. in breadth. These are next secured at both ends by ropes of the palm-fibre. Next comes a layer of palm-leaves, the strong, tough leaflets serving admirably as laths to uphold the coating of mud which is laid thickly over them. The mud is obtained from below without difficulty, and in any quantity required; and when trowelled smooth and dry, which it soon becomes under the hot sun,—constitutes an excellent floor, where a fire may be kindled without danger of burning either the laths or joists underneath. As yet the Guaraon has completed only the floor of his dwelling, but that is his principal labour. He cares not for walls,—neither sides nor gables. There is no cold frosty weather to chill him in his tropical home; no snow to be kept out. The rain alone, usually falling in a vertical direction, has to be guarded against; and from this he secures himself by a second platform of lighter materials, covered with mats, which he has already woven for the purpose, and with palm leaflets, so placed as to cast off the heaviest shower. This also shelters him against the burning sun, an enemy which he dreads even more than the rain. His house is now finished; and, with the exception of the mud floor, is all of the Itá palm,—beams, cross-timbers, laths, and mats. The ropes he has obtained by stripping off the epidermis of the full-grown leaflets, and then twisting it into cordage of any thickness required. For this purpose it is equal to hemp. The mats he has made from the same material; and well does he, or rather his wife,—for this is usually the work of the females,—know how to plait and weave them.

Like other beings, the Guaraon must at times sleep. Where does he stretch his body? On the floor? On a mat? No. He has already provided himself with a more luxurious couch,—the 'rede,' or hammock, which he suspends between two trees; and in this he reclines, not only during the night, but by day, when the sun is too hot to admit of violent exertion. His wife has woven the hammock most ingeniously. She has cut off the column of young leaves that projects about the crown of the

morichi. This she has shaken, until the tender leaflets become detached from each other and fall apart. Each she now strips of its outer covering, a thin riband-like pellicle of a pale yellow colour, which shrivels up almost like a thread. These she ties into bundles, leaving them to dry awhile; after which she spins them into strings, or, if need be, twists them into larger cords. She then places two horizontal rods or poles about 6 ft. apart, and doubles the string over them some forty or fifty times. This constitutes the woof; and the warp is obtained by cross-strings twisted or tied to each of the longitudinal ones, at intervals of 7 in. or 8 in. A strong cord, made from the epidermis of the full-grown leaves, is now passed through the loop of all the strings, drawn together at both ends, and the poles are then pulled out. The hammock, being finished and hung up between two trees, provides the naked Indian with a couch, upon which he may repose as luxuriantly as a monarch on his bed of down."

The practice of seeking a home among the boughs, although rare, is not confined to the savages of South America. Stedman makes mention of the same thing as observed by him in Africa, as does Mr. Moffat, who, detailing the curious sight, says, "Having travelled 100 miles five days after leaving Mosega, we came to the first cattle outposts of the Matabele, when we halted by a fine rivulet. My attention was arrested by a tall and gigantic tree standing in a defile leading into an extensive and woody ravine, between a high range of mountains. Seeing some individuals employed on the ground under its shade, and the conical points of what looked like houses in miniature protruding through its evergreen foliage, I proceeded thither, and found that the tree was inhabited by several families of Bakones, the aborigines of the country. I ascended by the notched trunk, and found, to my amazement, no less than seventeen of these aërial abodes, and three others unfinished. On reaching the topmost hut, about 30 ft. from the ground, I entered and sat down. Its only furniture was the hay which covered the floor, a spear, a spoon, and a bowl full of locusts. Not having eaten anything that day, and, from the novelty of my situation, not wishing to return immediately to the wagons, I asked a woman, who sat at the door, with a babe at her breast, permission to eat. This she granted with pleasure, and soon brought me more locusts in a powdered state. Several more females came from the neighbouring roosts, stepping from branch to branch, to see the stranger, who was to them as great a curiosity as the tree-dwellers were to him. I then visited the different abodes, which were on several principal branches. The structure of these houses was very simple. An oblong scaffold, about 7 ft. wide, is formed of straight sticks. On one end of this platform a small cone is formed, also of straight sticks, and thatched with grass. A person can nearly stand upright in it. The diameter of the floor is about 6 ft. The house stands on the end of the oblong, so as to leave a little square space before the door. On the day previous I had passed several villages, some containing houses all built on poles, about 7 ft. or 8 ft. from the ground, in the form of a circle. The ascent and descent is by a knotty branch of a tree placed in front of a house. In the centre of the circle there is always a heap of the bones of the game they have killed. Such were the domiciles of the impoverished thousands of the aborigines of the country, who, having been scattered and robbed by the Moselikatse, had neither herd nor stall, but subsisted on locusts, roots, and the chase. They adopted this mode of architecture to escape the lions which abounded in the country. During the day the families descend to the shade beneath, to dress their daily food. When the inhabitants increased, they supported the augmented weight on the branches by upright sticks; but when lightened of their load, they removed these for firewood."

Let us, however, descend to terra-firma, and take note of how the—well, it matters little where we begin. Polynesia is as good a starting-place as any; let us away there and make inquiry of Mr. Turner how the Samoan builds his house. That gentleman responds willingly and promptly. He bids you imagine a gigantic beehive, 30 ft. in diameter, 100 ft. in circumference, and raised from the ground about 4 ft. by a number of short posts at intervals of 4 ft. all round, and you have a good idea of the appearance of a Samoan house. The spaces between these posts, which may be called open doors and windows all round the house, are shut in at night by roughly-plaited cocoa-nut leaf blinds. During the day the blinds are pulled up, and all the interior exposed to a free current of air; the floor is raised 6 in. or 8 in. with rough stones; then an upper layer of smooth pebbles; then some cocoa-nut leaf mats, and then a layer of finer matting. In the centre of the house there are two or three posts or pillars, 20 ft. high, sunk 3 ft. into the ground, and extending to and supporting the ridge pole; these are the main props of the building. Any Samson pulling them away would bring down the whole house. The space between the rafters is filled up with what they call ribs, namely, the wood of the bread-fruit tree, split up into small pieces, and fastened together so as to form a long rod the thickness of the finger, running from the ridge-pole down to the eaves; all are kept in their places, 1½ in. apart, by cross pieces, made fast with cinnet. . . . . The wood of the bread-fruit tree, of which the greater part of the houses are built, is durable, and, if preserved from wet, will last fifty years. The thatch is also laid on with care and taste; the long dry leaves of the sugar-cane are strung on to pieces of reed, 5 ft. long; they are made fast to the reed by overlapping the one end of the leaf and pinning it with the ribs of the cocoa-nut leaflet, run through from leaf to leaf horizontally. . . . . The great circular roofs are so constructed that they can be lifted bodily off the posts, and removed anywhere, either by land, or by a raft of canoes, but, in removing a house, they generally divide the roof into four parts, with the two sides and the two ends, where there are no particular joints left by the carpenters, which can easily be untied and again fastened. There is not a single nail in the whole building; all is made fast with cinnet. A house, after the novel Samoan fashion, has but one apartment; it is the common parlour, dining-room, &c., by day, and the bedroom of the whole family by night; they do not, however, herd indiscriminately. If you peep into a Samoan house at midnight, you will see five or six low oblong tents pitched, or rather strung up, here and there throughout the house; they are made of native cloth, 5 ft. high, and close all round down to the mat; four or five mats laid loosely, the one on the top of the other, form the bed; the pillow is a piece of thick bamboo, 3 in. in diameter, 3 in. to 5 in. long, and raised 3 in. from the mat by short wooden feet. The sick are indulged with something softer, but the hard bamboo is the invariable pillow of health. The bedding is complete with a single sheet of calico, or native cloth. The fireplace is in about the middle of the house; it is merely a circular hollow, 2 ft. to 3 ft. in diameter, a few inches deep, and lined with clay. The furniture consists of the bed and bedding, a bundle or two of native cloth, a basket, a fan or two, a butcher's knife, a fishing net, a gun strung up along the rafters, a few paddles, a wooden chest in one corner, and a few cocoa-nut shell water-bottles in another; these are about all the things in the shape of furniture or property in a Samoan house.

Being in the neighbourhood, let us cross over to Fiji. We find that the Fijians are remarkable neither for elegance, harmony, nor stability in their habitations, as, says the observant missionary, Williams, in one district a village looks like an assemblage of square wicker baskets; in another, like so many rustic arbours; a third seems a collection of oblong hayricks with holes in the sides; while in a fourth these ricks are conical. By one tribe just enough framework is built to receive the covering for the walls and roof, the inside of the house being an open space. Another tribe introduces long centre-posts, posts half as long to receive the wall-plates, and others still shorter as quarterings to strengthen the walls. To these are added tie-beams to resist the outward pressure of the high-pitched rafters, and along the side is a substantial gallery, on which the property is stored. The walls or fences of a house are from 4 ft. to 10 ft. high, and in some cases are hidden on the outside by the thatch being extended to the ground so as to make the tranverse section of the building an equilateral triangle. The walls range in thickness from a single reed to 3 ft. The houses to windward of the island have the advantage in appearance, but those to leeward are the warmest. In the latter quarter patterns are wrought in the walls with cinnet and reeds. A house-builder, master of difficult patterns, is highly valued, and the work of some of them is so artistic and even elegant that it is a pity it is not more durable. Sometimes the reeds within the grass walls are reticulated skilfully with black lines. The fireplaces are sunk 1 ft. below the floor, nearly in the centre of the building, and are surrounded by a curbing of hard wood. Slight houses are run up in an incredibly short time. Williams relates that once when he was at Lakemba he passed a number of men who had just planted the posts of a house 20 ft. long. He was away for about an hour and a half, and on returning found the house finished, excepting the completion of the ridge.

Ordinary grass-houses have no eaves, but there is over the doorway a thick semicircular projection of fern and grass forming a pent. Some houses have openings for windows, and for protection against unwelcome visitors the doorways are made so low that swift and sudden entrance is extremely difficult. For thatching, long grass or leaves of the sugar-cane and stone-palm are used. The latter are folded in rows over a reed and sewn together, so as to be used in lengths of 4 ft. and 6 ft., and make a very durable covering. The leaves of the sugar-cane are also folded over a reed; but this is done on the roof, and cannot be removed, as the other may, without injury. The grass or reed thatch is laid on in rather thin tiers, and fastened down by long rods found ready for use in the mangrove forests, and from 10 ft. to 20 ft. long, and secured to the rafters by split rattans. Some very good houses are covered first with the cane-leaves and then with the grass, forming a double thatch. Sometimes the canes are made 2 ft. thick with ferns, and have a good effect; but when thicker they look heavy, and, by retaining the wet, soon rot.

The ridge of superior buildings receives much attention. The ends of the ridge-pole project for a yard or more beyond the thatch, having the extremities blackened and increasing with a funnel-shape, and decorated with large white shells. The rest of the ridge is finished as a large roll bound with vines, and on this is fixed a thick well-twisted grass cable; another similar cable is passed along the underside of the roll, having hung from it a row of large tassels.

A more animated scene than the thatching of a Fijian house can scarcely be conceived. When a sufficient quantity of material has been collected round the house, the roof of which has been previously covered with a network of reeds, from forty to three hundred men and boys assemble, each being satisfied that he is expected to do some work, and each determined to be very noisy over doing it. The workers within pair with those outside, each tying what another lays on. When all have taken their places and are getting warm, the calls for grass, rods, and lashings, and the answers, all coming from 200 or 300 excited men and boys, with voices of every imaginable key, stamping down the thatch and uttering shrill cries of exultation, produce a miniature Babel, in which the Fijian,—a notorious proficient in nearly every variety of halloo, whoop, and yell,—fairly outdoes himself. "I noticed," observes the gentleman already quoted, "three *bures ni sa*,—strangers' houses or sleeping bures. At least two of the latter are invariably found at every Fijian village or town. They may be compared to our clubs; and those frequented by the chiefs do not seem visited much by the lower orders of people. That at Bau was the largest I saw. All along the sides are sleeping-places, covered with fine mats, and large enough for two men to sleep, and between each there is a fireplace, and stages to put their legs on. Overhead a good supply of firewood is stowed. The centre of the building is covered with loose grass. There are no windows, only low doors, which may be, and always are, closed towards evening by means of thick mats, in order to keep the mosquitoes out. A large kava bowl and bamboo vessels filled with spring water seem to be the only utensils admitted. In buildings or bures like these, all the male population, married and unmarried, sleep. The boys, until they have come of age, erect a bure of their own, often built on raised stages over the water, and approachable only by a narrow trunk of a tree. The women and girls sleep at home, and it is quite against Fijian etiquette for a husband to take a night's repose anywhere except at one of the public bures of his town or village, though he will go to his family soon after dawn. In the daytime the bures are generally deserted. Towards four o'clock the people begin to pour in; and if any strangers arrive, they will invariably take up their quarters at these places. Here politics and all events of the day are discussed, and when talking the men,—even

high chiefs,—will be plaiting cocoa-nut fibre into cinnet, so much used in the construction of houses, canoes, and arms. And a great deal these people have to talk about: the politics of the groups, independent of the new element introduced by the cession of the country to England; the never-ending intrigues of the Tonguese immigration; the endeavour of missionaries, consuls, and traders to spread Christianity and civilisation, are rather complicated, and give rise to a good deal of discussion and speculation. When evening is coming on and the haze is beginning to fill, most of the fires between the sleeping-places are lit, and the natives are leisurely stretched on the mats, their legs cocked up on the stages like those of Yankees in a tavern, and all smoking their cigarettes,—made of self-grown tobacco and dry banana leaves. Now come the kava-chewers,—comely-looking youngsters,—carrying the large wooden bowl, a cocoa-nut shell for drinking the beverage, the bamboo water-vessel, a handful of fibre for straining the kava, and the root of the South Sea pepper from which it is prepared. No sooner have they taken their seats and commenced chewing, taking care to throw the rope affixed to the kava-bowl towards the person highest in rank, than a leading man, perhaps a heathen priest, begins chanting a song in which the whole assembly joins, and two young fellows beat time with little sticks applied on a bamboo or any other sounding wood that happens to be handy. The leader of the chant does not sit motionless, but waves his body, arms, and hands in such a variety of ways and with such extreme ease, that you fancy you can imitate him as readily as the whole assembly does; but the very first time you fail, to the great delight of your native spectators. His motions are not difficult, but you never know what they are going to be until it is too late to imitate, and he has already passed on to something else. The interest of this by-play is thus kept up, and the Fijians deserve full credit for having obtained hold of one of the great secrets of fixing the attention on an object, or making it, in other words, interesting. They know the art of concealing the end as long as possible. What would novelists do without the use of this machinery! How dull would life itself be if the future was unveiled to us. The lads having chewed a sufficient quantity of the root, place the masticated mass into the bowl. Now water is poured on the whole yellowish-looking fluid, strained through fibres, and a cup filled. Whilst the cup-bearer is holding it to hand to the chief, or highest personage present, an old man gives the toast, the cup is emptied in one draught, and thrown by the drinker on the mat to be filled again, and handed to the next in rank, until the whole assembly has been served. The song becomes less and less hearty, and conversation slackens, and one by one the men drop off to sleep. Strange sight. Their pillows are made of a thick stick, have four legs, and are put just under the neck, so that the hair of the sleepers may not be disarranged,—they having had it recently newly done up, washed with lime to make it frizzed like that of negroes, dyed in various colours, and arranged in many different ways. Several days must have been spent to get some of these extraordinary heads dressed. And for this reason,—no other,—they are ready to sleep all their lives on a pillow made of a stick of wood, and so constructed that a European could not rest his neck five minutes upon it without suffering dreadful pain."

Turning to Borneo, and to Mr. St. John as a guide, we travel to the village of Tungong, on the banks of the river Lundu. Here we find the curious spectacle of one building serving for almost the entire population. Tungong is enclosed by a slight stockade, and within this defence there is one enormous house for the whole population, and three or four small huts. The exterior of the defence between it and the river is occupied by sheds for prahus, and at each extremity are one or two houses belonging to Malay residents. The common habitation, as rude as it is enormous, measures 594 ft. in length, and the front room, or street, is the entire length of the building, and 21 ft. broad. The back part is divided by mat partitions into the private apartments of the various families, and of these there are forty-five separate doors leading from the public apartment. The widowers and unmarried men occupy the public room, as only those with wives are entitled to the advantages of separate rooms. The floor of this edifice is raised 12 ft. from the ground, and the means of ascent is by the trunk of a tree with notches cut in it,—a most difficult, steep, and awkward ladder. In front is a terrace, 50 ft. broad, running partially along the front of the building, formed, like the floors, of split bamboo. This platform, as well as the front room, besides the regular inhabitants, is the resort of pigs, dogs, birds, monkeys, and fowls, and presents a glorious scene of confusion and bustle. Here the ordinary occupations of domestic labour are carried on,—paddy ground, mats made, &c. There were 200 men, women, and children counted in the room, and in front, whilst we were there in the middle of the day, and, allowing for those abroad and those in their own rooms, the whole community cannot be reckoned at less than four hundred souls. Over head, about 7 ft. high, is a second crazy story, on which they stow their stores of food and their implements of labour and war. Along the large room are hung many cots, 4 ft. long, formed of the hollow trunks of trees cut in half, which answer the purpose of seats by day and beds by night. The Sibnowan Dyaks are a wild-looking but apparently quiet and inoffensive people. The apartment of their chief is situated nearly in the centre of the building, and is larger than any other. "Some thirty skulls were hanging from the roof of the apartment," continues Mr. St. John, "and I was informed that they had many more in their possession, all, however, the heads of enemies, chiefly of the tribe of Sarebus. On inquiry I was told that it is indispensably necessary a young man should procure a skull before he gets married. When I urged on them that the custom would be more honoured in the breach than in the observance, they replied that it was established from time immemorial, and could not be dispensed with. Subsequently, however, the chief allowed that heads were very very difficult to obtain now, and a young man might sometimes get married by giving presents to his lady-love's parents. At all times they warmly denied ever obtaining any heads but those of their enemies, adding, they were very bad people, and deserved to die. I asked a young unmarried man whether he would be obliged to get a head before he could obtain a wife. He replied, 'Yes.' 'When would he get one?'—'Soon.' 'Where would he go to get one?'—'To the Sarebus river.' I mention these particulars in detail, as I think, bad their practice extended to taking the head of any defenceless traveller, or any Malay surprised in his dwelling or boat, I should have wormed the secret out of them."

Let us now initiate the reader into some of the mysteries of the interior of the ordinary habitation of the Abyssinian, with its clay walls and conical thatch.

The "arat" is the couch or bed on which all town Abyssinians sleep, that it to say, all those who can afford such a luxury. It is a solid framework of wood on four legs. A fresh, raw hide is cut into strips, and these are stretched over the frame in and out—one crossing the other—about an inch or rather more apart. The whole tightens in drying, and forms a rather hard, but very agreeable cool bed. It is the custom always to sleep naked, but covered with the quarrie or cotton-cloth worn in the daytime, and the only bedding used is a piece of native tanned leather, so that the air has free access from below. In these hot climates, however, it is more usual to sleep out of doors, the arat inside the house being used for cold or wet weather only, or for receiving visitors in the daytime. The "midele"—a sort of fixed couch built of stone and plaster fixed against the wall of an inner chamber—in like manner is covered with a piece of red leather, unless it happens that some wealthy dame has a carpet of Egyptian or Turkish manufacture. The pillows are mostly of wood, either a square block about 4 in. long by 3 in. broad, a little hollowed on one side for the head, or sometimes very tastefully shaped, the stand being neatly turned like a candlestick bottom. It is about 7 in. or 8 in. high, and the part on which the head rests is crescent-shaped. Some of the latter are made of ivory, and stained with henna. This form of pillow is very necessary to people who, from the custom of having their hair fancifully dressed and arranged, and plastered with butter, could not lay their heads on any ordinary one, as they would saturate it with grease, besides seriously disarranging their coiffure, so they use the hollow wooden pillow, just laying their ear on it, and allowing their hair to hang freely behind. It is rather fatiguing at first to be obliged to keep one's head for a whole night in one position, and that, indeed, not the most comfortable; but habit reconciles one to almost anything. The floor is carpeted with grass, which, in the first instance, is spread nearly 6 in. deep all over the room, and afterwards, whenever a visitor comes, a little fresh grass is politely strewed for him to sit on, so that in course of time it accumulates to a considerable quantity. Now this is one of the most disagreeable customs in the country, for, as before and after meals, and on other occasions, the hands of every person in the room are washed by a servant pouring water on them out of a drinking-horn, or any other utensil he may have at hand, you are obliged, from the want of a basin to receive the water, to scratch a small hole in the grass to prevent it splashing you. Add to this the beer and liquids spilt there every day, the manure left by the mules' feet in passing to and fro from the stable, and the cleaning out of the stable itself, which is done two or three times a week for the sake of the mules' feet, which would otherwise become softened by remaining in the wet. This last operation makes a great deal of dirt, for, having no buckets, they carry out the manure and filth in any sort of basket, gourd, or dish they can lay their hands on, dropping, of course, a good deal on the way. This carpet of grass becomes in time nothing less than a manure heap in a high state of fermentation or putrefaction. Its surface, from the continual supply, keeps an appearance of freshness; but though the eye may be deceived for a time, the nose cannot be, and the smell becoming intolerable, the whole is obliged to be cleaned out. For at least a day after this operation the house must be left to ventilate, otherwise no one could live in it. Dirty as this practice is, we cannot much complain of it in the Abyssinians, as the old English custom of strewing the room with rushes entailed consequences that would probably nowadays seem quite as disgusting. Let us now take a survey of the kitchen. Imagine a small room about 10 ft. long, 6 ft. broad, and 8 ft. high, with or without a window, according to circumstances, but more usually without one, and at all events without a chimney, so that the smoke, which is always kept going, and that vigorously, finds the door the nearest exit, and it may be easily conceived that the atmosphere is so dense as to render it difficult for any one but a native to remain long in the room. Even the cook-women, who pass the greater part of the day in this smoke, never think of standing up to do their work, but always remain squatted as low as possible, either near the door or fire. Every article the room contains becomes, like the apartment itself, of a pure soot black. The kitchen utensils are, the "magogo," or oven, if it may be so called; a few jars of different forms and sizes, according to the use they are intended to be put to,—some with long necks and narrow mouths, for keeping water in; others with wide mouths and no necks at all, for holding the liquid dough of which the bread is formed; and the earthen dishes or saucers in which the meat and other eatables are prepared and served up. The "magogo" is an oblong building, 3 ft. by 4 ft., and about 1 ft. high. It is constructed of clay and small stones, with a place in the centre for a fire. The whole is covered with a circular slab of a sort of pottery-work, being nearly the same material as that of which the dishes are formed, nicely polished on the upper surface, which is slightly concave, in order to receive more easily the liquid dough for the bread. At the back is a hole by which the smoke may escape, and in front a sort of doorway, by which the fire is lighted, and which, being placed exactly opposite the kitchen door, has always a draught of air to keep up a good fire. The cover is made of clay, and is used to keep out the smoke and dirt, and to retain the heat.

We shall next speak of the habitations of the people of the Soudan.

New Brighton.—The new (R. C.) Church of St. Peter and St. Paul, built on a site in Rowson-street and Hope-street, has been opened. The church, in which accommodation is provided for from 350 to 400 persons, is arranged with a nave and gallery, while at the east end are the chancel, a transept, and a sacristy. Early English is the style of architecture, which has been adhered to by the architect, Mr. Edmund Kirby. Mr. William Owen, of Liverpool, was the contractor.

ARCHITECTURE, AND ITS POPULAR STUDY.

It has been asserted that architecture is distinguished by reason of its being the least popular of the fine arts. That such an assertion is founded on truth is the daily experience of most practitioners.

Every man of average education deems himself a connoisseur on the subjects of painting, sculpture, music, and poetry, yet architecture seldom evokes intelligent criticism, even from those fairly conversant on art topics generally. The popular appreciation for architecture would appear to go no farther than the acquisition of the necessary knowledge to distinguish the Italian from the Gothic building. It is an every-day question put to architects when submitting their designs, "What style do you call that?"

That misconception, not to say ignorance, largely prevails amongst the educated classes as to the general principles of architectural art was clearly shown by a recent review in the *Builder*. That an art in which all are directly interested,—the productions of which are forced upon the sight equally with those of nature,—should be so little understood, appears at first sight somewhat unaccountable. All persons are to some extent susceptible to the influence of sweet harmonies, the rhapsodies of the poet, and the glowing canvas, whilst architecture in its more refined phases is to them as an unknown language, a sealed book, a blank page. To the majority, architecture is a huge, sensuous reality, appealing to their visive organs by reason of its solidity and magnitude. It fails to awaken the pleasures of association or imagination, or to excite their interest by the intellectual impress ever present in architectural works. They are not roused by the halo of historical events inseparably connected with architecture, neither do they appreciate what Addison terms "that greatness of manner in architecture which has such force upon the imagination, that a small building where it appears shall give the mind nobler ideas than one twenty times the bulk where the manner is ordinary or little." Superficial observers are apt to admire and wonder at the pyramids, whilst failing to discover cause for admiration in the Parthenon. What impresses them is the element of *bigness;* the subtler beauties of architecture remain undiscovered. How many thousands daily pass the New Law Courts, seize upon their magnitude, and ejaculate "Fine building"! How insignificantly small the number of those who can grasp something more than bulk,—the very soul of the building,—the petrified thought! This indifference and inaptitude may be accounted for in some degree by the fact that, whereas music, painting, and poetry, are in a measure understood, and excite pleasurable emotions without demanding special knowledge of harmony, the technicalities of painting, or the rules of versification, architecture requires for its proper appreciation special study and an acquired taste. When sought this knowledge is of easy attainment, and such is the pleasure derived from its acquisition that, as Addison truly observes,—"A man having a taste for architecture is as one possessed with another sense compared with the man who has no such taste." Many reasons could be advanced showing the desirability for making the study of architecture a popular recreation, equally with the other branches of fine art, chief amongst which is its practical utility,—its great claims to being regarded as one of the most intellectual pursuits, inseparably connected as it is with the world's history, being in many instances the only remaining record of events long since passed. The study of practical architectural principles would enable all to exercise judgment and taste in the selection of their dwellings; it would afford means of ascertaining what is good or bad in construction, what required in altering, repairing, or fitting up, and what appropriate in decorating or furnishing.

All men, it is true, do not build houses, yet all men live in them; consequently a knowledge of such constructive arrangements as will contribute to comfort and convenience, and such an acquaintance with the distribution of parts as will enhance the elegance of their dwelling, ought not to be a matter of indifference to any man or woman.

Had we not cognition to the contrary, it would be only reasonable to assume that the peculiar conditions under which we live would foster the popular study of architecture, for it is characteristic of modern art that, contrary to the usual practice of the ancients, its greatest efforts are discernible in private mansions of every size and degree. This is a distinguishing feature in the practice of architecture in our own time as compared with that of prior civilisations. In former times the utmost beauty and embellishment of which architecture was capable were lavished upon public buildings, whereas the introduction of architectural pretensions into private dwellings was the exception and not the rule. To a great extent a system the reverse of this now prevails. There does not, as in ancient times, exist a popular appreciation for architecture which will sanction without murmur that lavish expenditure upon national edifices which is requisite to the production of really noble and artistic buildings. The nobleman and merchant prince will freely invest his means in an ostentatious dwelling-house for his own use, whilst failing to subscribe according to his wealth towards the erection and embellishment of local or national edifices.

If we were to argue from analogy we might be tempted to assert that architecture as an art was in a state of retrogression; for on an examination of past history we find that the popular appreciation for architecture was in inverse proportion to the elegance of private dwellings; hence, "in those ages when the grandest and most beautiful temples were erecting in Greece, the most sumptuous palaces in Italy, and the magnificent cathedrals in England, there is no evidence of much improvement having been introduced into the private dwellings even of the wealthy." To those who occupy what are called "good houses," either in town or country, a knowledge of architecture would tend to enhance the desirableness of their possession, whilst at the same time being a source of practical value to them. Its acquisition is a mark of refinement, and the "open sesame" to a vast store of intellectual enjoyment. Turn in whatever direction we please, architecture in some phase meets the eye. It can be studied in all climes, all places, and at all times. Its enjoyment demands no expense and comparatively little fatigue. Its beauties are the property of the impecunious equally with the rich; for beauty is the property of no man; it belongs to him who can *see it*. It has been truly observed by one of England's greatest writers that a taste for architecture gives a man "a kind of property in everything he sees," whilst he will frequently experience greater satisfaction in contemplating an edifice than its actual possessor. Being an art which appeals to the reason equally with the imagination, the beauties or deformities in architectural works are easily rendered obvious to the most ordinary understanding. Great and desirable results might be hoped for from the more popular study of architecture. Our towns would be projected with greater regard for convenience and comfort. Houses would be erected on sound sanitary principles, and display some degree of taste in their design and arrangements, whilst public edifices might be justly celebrated for their more than usual architectural elegance. "Jerry-builders" and "cheap-jack speculators" would soon become extinct. Miles of verdant fields would then give place to something more worthy our boasted intelligence and pre-eminence than vulgar vernacular villas. It is rarely that architecture has the opportunity for benefiting by the intelligent criticism of those outside the ranks of its professors. This, however, would no longer be the case were the study of this art once made popular. Whilst anxious to see architecture popularised, it is not our intention to make every man an architect; for we cannot countenance the "every-man-his-own-doctor" principle, but simply to create in the minds of the populace an intelligent appreciation for the best artistic work; to cherish a national feeling of respect founded on admiration, without which, as Ruskin says, "a great school of architecture cannot exist." Architecture embraces so much that it is difficult to define clearly where is the beginning and where the end. Equal pleasure and profit may be derived from its study by the philosopher, scientist, historian, poet, painter, priest, or layman. The art is universal; coeval with man, providing his shelter whilst living, his tomb when dead. It has been observed that no institution can be established without its aid. "It gives to art its gallery, to science its museum, to literature its library, to education its colleges, to benevolence its asylums, to religion its temples." It is frequently alluded to in sacred writings, and all the sciences are more or less laid under tribute in the erection of even some of the least remarkable buildings: chemistry in the composition of materials; geology in the selection of sites and building materials; conic sections and geometry in setting out the domical roof, the noble Gothic vault, or elaborate tracery; statics in general structural stability, counterpoising the thrust of arches or resisting downward pressures; dynamics when opposing bodies in motion; optics when studying general æsthetic refinements: acoustics when arranging buildings for public discourse or musical entertainment; physiology and the laws generally pertaining to health, in the planning of dwelling-houses; law, in its relation to the construction of buildings, the preparation of contracts and agreements, the subject of ancient lights, easements, boundaries, party structures, dilapidations, fixtures, and titles. That the professor of an art embracing so much should accumulate a vast store of miscellaneous information is absolutely imperative, and it is equally essential that he keep himself "abreast of the times" as regards artistic, scientific, and sanitary knowledge. If not a philosopher, he must cultivate a philosophical temperament; for probably no other professors are so frequently opposed and thwarted in their legitimate aspirations by monied vulgarity or unlettered ignorance. He must be a man of refinement, business tact, and withal, courteous; for has he not to propound his ideas to his noble patron; direct their practical execution by the artisan, and frequently reconcile conflicting opinions and opposed interests? Notwithstanding the numerous claims which architecture has upon the attention of all cultivated minds, yet its unpopularity has resulted in the architect being looked upon by thousands of fairly intelligent people as a "man who draws."

This is all the more to be regretted, seeing that it requires but a mere superficial examination as to the true position of architecture to discover what an essential part it performs in our every-day life, and also the many points of view from which it may be studied. Architecture provides the noblest frame-work for painting and sculpture. The greatest painters, sculptors, workers in mosaic and precious stones, have deemed it an honour to aid in the embellishment of the architect's creations, and the landscape gardener has put forth his best efforts to beautify the "stately homes of England,"—

> "Embosom'd high in tufted trees."

An architect has the noble privilege of improving nature. The abbeys, castles, mansions, villages, spires, forges, mills, bridges, scattered amongst the hills and valleys, enhance the beauties of nature and give contrast and animation to the scene. Many of these buildings are rich in historical association,—others but of yesterday for future generations to gaze upon and admire. A halo of sacred mysteriousness surrounds the many venerable piles:—

> "The lonely turret, shatter'd and outworn,
> Stands venerably proud,—too proud to mourn
> Its long-lost grandeur."

Might we not truly say of many of the ruined abbeys of England and their delightful surroundings,—

> "It is a spot under these northern skies
> Beautiful as a wreck of Paradise."

The popular study of architecture would tend greatly to augment the pleasure of travellers and tourists. In the works of architecture there is an exhaustless, never-ending variety. From the most northern Gothic pile to the rock-cut temples of India, how wonderful is the display of human industry! We have here the impress upon matter of a thousand generations; their intellectual seals; their gorgeous epitaphs! What, we may ask, are countries without their architecture? Is it not for this that we visit Egypt, India, Greece, and Normandy? What more impressive than the ruins of Karnack, Luxor, Thebes? What more fanciful or gorgeous than the Courts of the Alhambra? What are the attractions in Rome, Venice, and Athens? Are not the Colosseum, St. Peter's, St. Mark's, the Pantheon, St. Sophia, the Parthenon, and many of our own cathedrals, poems in stone, histories in themselves? A celebrated French writer speaks in rapturous terms of St. Peter's, as clothing the idea of God in all the splendour of which it is capable; and our own Macaulay, writing of the same building, says,—"In I went, and I was, for a moment, fairly stunned by the magnificence and harmony of the interior. I

never in my life saw, and never, I suppose, shall again see, anything so astonishingly beautiful. I really could have cried with pleasure. I rambled about for half an hour or more, paying little or no attention to details, but enjoying the effect of the sublime whole." Many similar impressions have been chronicled, yet how many of those who visit the cathedrals of York, Westminster, Ely, Salisbury, Milan, Antwerp, Cologne, Constantinople, and a thousand other places, fail to thoroughly appreciate the many beauties, both of design and construction, or can dwell on the charms of historical association, for lack of a little previous study?

Architecture is a favourite theme with the poet, many of his figurative expressions being borrowed from its vocabulary, whilst it is for ever linked with the greatest names in history. Kings, statesmen, philosophers and poets have obtained lasting fame by reason of their connexion with and patronage of architecture.

Such is the pleasure to be derived from the study and contemplation of the glories of this art that every man and woman who professes cultivated taste should regard a knowledge of architecture as "no honour to have it, but a dishonour not to have it." There exists around this study a peculiar charm apart from any theories of art. As an archæological study it constitutes one of the most fascinating inquiries; for whether we trace its progress through ancient or modern times, it is so intimately connected with all that is remarkable in the world's history that a knowledge of it will give equal pleasure, and its acquisition be as profitable to the mind, as a smattering of two or three dead languages. We trust that what we have advanced in favour of the more popular study of architecture will prompt non-professional readers to devote a small portion of their leisure to acquiring the rudimentary principles of an art which "embraces all that is beautiful," whilst at the same time it can awaken emotions and pleasing memories within the breast of the learned and unlearned, the rich and the poor, the king and the cottager, presenting as it does in innumerable instances veritable "sermons in stone."

J. G. B.

"SPENCER, SPARE THAT TREE."

As was noticed in these columns not long since, much opposition has been expressed to the proposal for removing from before the old entrance to the South Kensington Museum the superb plane-tree with its encircling seat, that for so long has been a familiar feature to all visitors to that wonderful institution. Since the new entrance to the Museum has been opened, the old tree has been sadly neglected, and now, of the thousands of visitors who pass through the busy turnstiles, only a few of those who recall the commencement of the museum probably ever bestow a glance on the old tree whose existence is threatened. It is sincerely to be hoped that it will be spared. Though our metropolis is so green, it can ill afford to lose so characteristic an adornment, and we trust the authorities of the Science and Art Department will do their best to preserve it.

The old plane-tree is something more than a mere tree; it is, like, indeed, most of the older trees of the metropolis, a landmark. The tree was once part of Old Brompton Park, which will be found marked on the maps of some forty or so years since. Almost under the shadow of its branches stands the now almost ruined lodge in the secluded private garden of the museum on the left of the new entrance. Even at this moment the old place shows strong remains of its past beauty. On this ruin, for such it has become, may be seen a tablet stating in enamelled letters that in the house had resided "Benjamin Franklin, artist [*sic*], philosopher, and statesman."

EASTBOURNE SANITARY EXHIBITION.

THE arrangements for this exhibition, we hear, are progressing satisfactorily, and a successful result is expected. Lectures will be delivered by Dr. Alfred Carpenter, on the evening of the opening day,—Monday; on Tuesday by Professor Robert Kerr; on Wednesday by Mr. E. C. Robins; on Thursday by Mr. George Wallis; on Friday by Mr. E. W. C. F. Schmidt; and on Saturday by Mr. I. Shone. The afternoon lectures will be delivered by Mrs. Johnstone, of Hastings, Mr. Mardon Mowbray, Mr. F. G. Cooke, and others.

FROM FOREIGN SERIALS.

ITALY.

Le Journal d'Italie (July 7).—Amongst the exhibits at the Milan Exhibition, which are referred to in this number, is the class for cremating apparatus. Many various systems are represented; those of Polli and Clericetti, Venini and Poma, Betti and Teruzzi, and Guidini.——Amongst the numerous anatomical preparations exhibited are some specimens prepared by Dr. Efesio Marini, of Naples. By means of a process which is not described, he has succeeded in converting human remains into a substance as hard and durable as marble, whilst retaining their colour and texture. He exhibits as a specimen a mosaic bowl, composed of fragments of various portions of the human body.

GERMANY.

Dingler's Polytechnisches Journal (July).—The two numbers for the present month contain an abstract of the papers read at the general meeting of the Society of German Cement Manufacturers. It is too long for us to give more than the titles of the various papers. These are: "The Influence of the various Degrees of Fineness in the binding power of Cement," by Mr. Somei, who also gave an account of new apparatus for grinding and screening cement; "The Scientific Drying of the Materials," by A. Bernoully, who described the various furnaces and stoves for the purpose. The question of the best system for testing cement and for the preparation of the briquettes, was the subject of a discussion, in which a number of speakers took part. The subject will be resumed next month, when we may recur to it.

FRANCE.

Revue Industrielle (July 20).—The Société Technique de l'Industrie du Gaz has announced that the following premiums will be given in connexion with the industry which it represents:—4,000 francs to be distributed amongst the authors of the best papers presented at the meeting in 1882; 2,000 francs to be divided amongst the introducers of the most important improvements in gas-lighting; 250 francs for each of the best papers presented to the meeting of the present year; 500 francs (given by the Lyons Gas Company) for the best system of heating by gas; 200 francs to the foreman or workman showing the longest service in a gas-works.

This number of the *Revue* contains illustrations of a new surveying instrument, called the topographical square, invented by M. A. Penesau. It is composed of a metal mirror whose plane makes an angle of 45° with the line of vision, and having a thread down its median line. It is fixed on a gun-barrel, which also carries a sight, and has below the mirror a weight of lead and wood, kept in its place by a spring, and released by pulling a trigger. The object of the apparatus is to find the perpendicular of any given spot. A pole having been previously fixed on the place whose perpendicular is required, the operator holds the instrument like a gun, looks through the sight, adjusts the "square" in the direction of the pole, and walks on until it is reflected exactly upon the thread which marks the middle of the mirror. As the line of vision passes through the eyehole of the sight to this median thread, and as the mirror is at an angle of 45° to the line of vision, so soon as the image of the pole falls upon the median thread, the foot of the perpendicular has been reached. The operator touches the spring, and the weight falls to the ground and marks the spot.

THE LATE DEAN STANLEY.

SIR,—I have been reading the report which you (alone, I think) published more than three years ago (*i.e.*, in April, 1878) of the interesting and eloquent funeral sermon preached by the late Dean Stanley on the occasion of the death of Sir Gilbert Scott. In that sermon occur these words:—

"We cannot forget him. Roof and wall, chapter-house and cloister, the tombs of the dead and the worship of the living,—all speak of him to those who know that his hand and his eye were everywhere amongst us."

How truly applicable are the words of the preacher to the preacher himself! The whole sermon is well worth reading, and possesses a melancholy interest at this time.

L.

HEALTH AND ART QUESTIONS: SOCIAL SCIENCE ASSOCIATION.

THE following are the special questions in the two departments most interesting to the majority of our readers to be discussed at the Dublin Congress, October 3rd to 8th:—

Health Department.—1. Is it desirable that hospitals should be placed under State supervision? 2. Is it (*a*) desirable that there should be a system of compulsory notification of infectious diseases, and, if so (*b*), what is the best method of carrying such a system into effect, and (*c*) what is the best method of enforcing the isolation of cases of infectious disease? 3. Is any further legislation desirable in order to more effectually prevent the overcrowding of dwelling-houses.

Art Department.—1. What should be the condition of copyright as regards music, painting, sculpture, and the fine arts generally, considered in relation to the Bill introduced into the House of Commons? 2. What should be the relations of painting and sculpture to architecture? 3. What is the influence of the annual exhibitions of contemporary pictures and sculpture on art and public taste?

ARCHITECTURAL AND SANITARY EXHIBITION AT INVERNESS.

IT is intended to open a museum of architectural, building, and sanitary appliances in Inverness, in August next.

Inverness, the capital of the Highlands, and the business-centre of a very extensive district, is considerably removed from manufacturing towns, and the architects and builders have difficulty in bringing before their clients examples of articles specified or wanted, and recourse has to be had to catalogues and lists, which, at the best, convey but a faint idea of the reality, or samples have to be sent for, entailing considerable delay and inconvenience. An exhibition, therefore, of such articles as are constantly wanted in the building and other allied trades cannot fail to prove beneficial alike to exhibitors and to the public.

Intending exhibitors should apply at once for space to Mr. Daniel Warren, the secretary.

SMOKE ABATEMENT.

ON Tuesday afternoon a meeting was held at Grosvenor House for the purpose of receiving a report from the committee appointed at a previous meeting of the National Health and Kyrle Societies, to consider the steps which should be taken towards abating the mischief occasioned, especially in large towns, by smoke. The chair was taken by Mr. Ernest Hart, and amongst those present were the Princess Louise, Marquis of Headfort, Sir Algernon and Lady Borthwick, the Hon. Rollo Russell, Lord Thurlow, Admiral Sir Spencer Robinson, Dr. C. W. Siemens, the Earl of Dartrey, Mr. S. Morley, M.P., Mr. G. Cubitt, Mr. A. T. Amherst, M.P., Lady Hobhouse, Earl of Carysfort, Lord Arthur Russell, M.P., Professor Abel, &c.

Mr. W. Coles (honorary secretary) read the report of the committee, which stated that in view of the increasing size of towns and the injury to health resulting from the excess of smoke, the objects the society had in view were considered to be of the greatest importance, and called for public support.

Dr. Siemens moved "That the present smoky atmosphere of London injuriously affects the health and happiness of the community, besides destroying public buildings and deteriorating perishable fabrics, and entailing in various ways unnecessary expenditure." As long as twenty years ago he had directed his attention to the subject of economising fuel, and subsequently to that of consuming smoke. It was evident that smoke was the result of imperfect combustion, and imperfect combustion was caused by the irregular supply of fuel to the grate. Gaseous heat, he contended, was double that of coal heat, given the same proportions of fuel used. It was true, however, that at present gas cost more than double the amount that ordinary fuel cost. The difficulty could, however, be overcome by the gas companies if they would separate their illuminating from their heat-supplying gas, and sell the latter at a low price. By a combination of coke and gas a fire representing as nearly as possible an ordinary coal fire, without, however, having any smoke, could be secured.

Sir H. Thompson seconded the motion; and

Dr. Quain said he entirely agreed with the views expressed by Dr. Siemens, and hoped he would not rest from his labours until those views were practically carried out.

The motion having been carried, the following resolutions were also adopted:—"That this meeting approves of the action of the Smoke Abatement Committee of the National Health and Kyrle Societies, in promoting the exhibitions and trials of improved heating and smoke preventing appliances, to be opened at South Kensington in October next." "That this meeting will support the efforts now being made to reduce the evil arising from coal-smoke, and will assist in raising the funds necessary for completely carrying out on a practical scale competitive testing of the various appliances to be shown at South Kensington, and for providing the funds necessary for suitable prizes, medals, &c."

PATENT RECORD.*

APPLICATIONS FOR LETTERS PATENT.

3,000. G. Crawford, Port Glasgow. Self-closing taps, &c., and apparatus for checking waste of water. July 8, 1881.

3,002. J. Griffiths, Weobley. Apparatus for purifying smoke. July 8, 1881.

3,020. H. Howitt, Ilford. Sash bar for horticultural buildings. July 9, 1881.

3,037. J. Gooddy, Wombwell. Securing the joints of earthenware and other piping. July 11, 1881.

3,055. C. M. Scott, Dalkey. Disinfecting apparatus. July 12, 1881.

3,067. J. Gilmore, Lower Norwood, and W. R. Clark, Peckham. Apparatus for accelerating an outward draught from chimneys, &c. July 13, 1881.

3,079. J. Cornforth and E. T. Burton, Birmingham. Open fire-grates. July 14, 1881.

3,081. W. Dawes, W. H. Thompson, and D. Thompson, Leeds. Water-closets and urinals. July 14, 1881.

NOTICES TO PROCEED

have been given by the following applicants, on the dates named.

July 12, 1881.

1,859. T. C. Fawcett, Leeds. Brickmaking machinery. April 29, 1881.

2,743. H. H. Lake, Southampton-buildings. Construction of Pavements. (Com. by D. McLean, New York, U.S.A.) June 22, 1881.

July 15, 1881.

1,033. G. Hunter, Leeds. Apparatus for consuming smoke in furnaces or fire-places. March 10, 1881.

1,038. W. R. Lake, Southampton-buildings. Water-closet apparatus. (Com. by A. Edwards, Philadelphia, U.S.A.) March 10, 1881.

1,380. W. E. Crowther, Manchester. Ornamental screens for fire-places. March 29, 1881.

1,815. H. Sutcliffe & W. Sutcliffe, Halifax. Moulding of water-closet cisterns. April 27, 1881.

2,636. G. J. Cox, Maidstone. Gas cooking and heating stoves. June 16, 1881.

2,793. J. L. Seymour, New-cross. Venetian blinds. June 25, 1881.

2,813. E. Lee, Leeds. Producing designs on tiles, glass, &c. June 27, 1881.

ABRIDGMENTS OF SPECIFICATIONS

Published during the Week ending July 16, 1881.

4,990. J. Bruce, Birmingham. Apparatus for opening, closing, and fastening casements, sashes, &c.

These are hung on pivots. A lever has a fixed fulcrum at its lower end, and the upper end has a stud which fits into a slotted hole in the upper corner of the sash. The lever, at some point intermediate of its length, is connected by a link to a rod which is laid down and connected to a hand lever, by which it is actuated. Nov. 30, 1880. Price 6d.

4,997. W. Morgan Brown, Southampton-buildings. Making doorways, &c., close and tight.

The frames are made with the corners rounded off and without the usual rabbet or stop, but, instead, a smooth bevelled seat extending all round. The door is also round cornered with a continuous bevelled edge, which is grooved to receive a packing of india-rubber or other material. (Com. by G. B. Thompson, Pitston, U.S.A.) Dec. 1, 1880. Price 10d.

5,078. S. H. Adams, Leeds. Apparatus for flushing drains.

A small syphon is placed within a larger one, so as quickly to withdraw the air therefrom and bring it into action. A small hole is made in the larger syphon above the point at which the liquid is drawn off, so as to make the action intermittent. (*Pro. Pro.*) Dec. 6, 1880. Price 2d.

5,099. W. Stead, Northallerton. Meters, &c.

These are applicable for both liquids and gases. Feathering discs are mounted in pairs on axles passing through a central shaft, and enclosed in a casing, which has an expanded acting channel, which the disc entirely fills up for half the revolution, when it comes to a contracted return channel, by which it is automatically flattened, at the same time opening the opposite disc. Dec. 7, 1880. Price 6d.

5,112. W. Wildig, Chester. Flushing apparatus for closets and drains.

A circular drum is made to revolve on a pipe, and is placed in a tank. The liquid being supplied to the drum it turns over and discharges its contents. (*Pro. Pro.*) Dec. 8, 1880. Price 2d.

5,116. R. Schloesser, Manchester. Water-meters, &c.

A circular shallow vessel has a central vertical spindle on which are six horizontal arms, three of which carry wings which exactly fill the passage through which the water flows. The passage has a partition on one side, so that the water is forced to take one direction. The other three arms exactly fill the space over the top of the partition, so that they form stops between the inlet and outlet passages. The wings are hung loosely on the arms so that they can pass over the partition also. The revolving spindle is attached to the usual counting gear. (Com. by MM. Dreyer, Rosenkranz, & Droup, Hanover.) Dec. 8, 1880. Price 6.

5,126. J. A. Mays, Great Winchester-street. Valves, &c.

A collapsible diaphragm is used in conjunction with a ball-valve, to close the aperture for the passage of the water when the ball-sinks. (*Pro. Pro.*) Dec. 8, 1880. Price 2d.

5,201. B. C. Cross, Dewsbury. Trough water-closets.

This is an improvement on Patent No. 2,324 of 1878 in that the urine is conveyed away by a separate channel, and fills the small tank which controls the syphon, instead of water as previously claimed. (*Pro. Pro.*) Dec. 11, 1880. Price 2d.

* Compiled by Hart & Co., Patent Agents, 28, New Bridge-street, E.C.

ARCHITECTS' BENEVOLENT SOCIETY.

A SPECIAL general meeting of contributors to the Architects' Benevolent Society was held on Tuesday afternoon last in the Council Room of the Royal Institute of British Architects, Conduit-street, to confirm the new edition of the by-laws, as revised at the annual meeting held in March last. The President, Mr. John Whichcord, was in the chair, and there were present Mr. G. J. J. Mair, Mr. Ewan Christian, Professor Hayter Lewis, Mr. Henry Currey, Mr. J. H. Good, Mr. H. L. Florence, Mr. E. l'Anson, Mr. Matt. Wyatt, and Mr. W. H. White, hon. sec.

The minutes of the annual general meeting having been read and confirmed, it was resolved that the by-laws, as revised, be adopted. Most of the alterations which have been made in them are consequent on administrative changes which were felt to be desirable when the society passed under the *ægis* of the Institute. These changes have been effected with the view of securing efficiency combined with economy of administration.

We may perhaps usefully call the attention of our readers to the concluding words of the report of the Council presented at the last annual meeting:—

"The total income of the Society, from subscriptions, barely exceeds 300*l*. The number of contributors during the past year is less than 250, and these are to a large extent recruited from the Institute. Yet, though the professional members of that body now number nearly 800, only 140 Fellows and Associates contributed to the Society's funds during 1880. Considering the increasing numbers entering the profession, and the many practising architects in the populous cities of the United Kingdom and Ireland, the Council trust it will not be in vain to earnestly impress on contributors the necessity of obtaining additional subscribers and donors, remembering that all who run a race cannot win; that distress, disease, and affliction may overtake the most prosperous, and compel many a professional brother, his widow and children, to seek assistance from the Society to alleviate the sad consequences of such reverses."

THE BUILDERS' BENEVOLENT INSTITUTION.

THE thirty-fourth annual meeting of this Institution was held at Willis's Rooms, King-street, St. James's, on Thursday last, Mr. Thomas F. Rider, president, in the chair.

The report, read by the secretary, Major Brutton, reviewed the affairs of the Institution during the past year, and congratulated the subscribers and donors on the result, which had been most gratifying, owing to the energy and liberality of the president. While feeling extremely grateful for the liberal donations received, the committee urge the necessity of obtaining new annual subscribers, and hope that the present subscribers will take every opportunity of bringing the Institution under the notice of those who do not as yet subscribe. The annual ball, as usual, was in every way a success, rendered so by the energetic honorary secretary, Mr. F. W. Keeble, who was supported by an efficient number of stewards, and to whom the committee offer their grateful thanks. The committee also express their thanks to the "Thalian" Amateur Dramatic Company, for the very excellent performance they were kind enough to give at the Imperial Theatre in May last, in aid of the funds of the Institution, and especially to Mr. Douglas Fourdrinier for originating and carrying out the entertainment, which was so successful both financially and as a dramatic performance. Nine pensioners have been elected during the past year, and eight have died.

The balance-sheet, audited by Messrs. J. H. Hunter, J. Cruttenden, and R. J. Ward, shows that 1,632*l*. 19*s*. 8*d*. was paid to pensioners during the year, besides 38*l*. paid as burial money. The balance brought forward from last year was 788*l*. 1*s*. 4*d*. The annual subscriptions amounted to 810*l*. 2*s*. 6*d*., and the donations to 977*l*. 4*s*. 6*d*. The profit on the annual ball was 54*l*. 7*s*. 11*d*., and the profit on the theatrical performance was 102*l*. 6*s*. The dividends on invested fund amounted to 643*l*. 2*s*. 8*d*., and there remained a balance of 1,349*l*. 15*s*. 4*d*. at the bankers'.

The report and balance-sheet having been adopted, it was resolved, on the motion of the chairman, seconded by Mr. Plucknett, to alter Rule II. by omitting the words, in sections 1 and 6, "for each candidate to be elected."

A vote of thanks was passed (on the motion of Mr. Plucknett, seconded by Mr. Thomas Stirling) to Mr. Rider for his services as president during the past year; and votes of thanks were also given to the vice-presidents, trustees, treasurer, auditors, and committee. Mr. Plucknett was re-elected treasurer, and Mr. Keeble was desired to again act as hon. sec. for the ball. It was unanimously resolved that George Burt, Esq., J.P., ex-sheriff of London and Middlesex, and a member of the firm of J. Mowlem & Co., be elected President of the Institution for the ensuing year; and it was announced that the annual dinner will be held at the Freemasons' Tavern on the 3rd of November.

NEW BATHS AT LONGTON, STAFFORDSHIRE.

THE Longton Public Baths, erected by the municipality, have been completed and opened.

The first-class swimming-bath leads out of the corridor facing the hall. The dimensions of this bath are 70 ft. by 40 ft.; the depth at the shallow end 3 ft. 4 in., shelving down to 6 ft. 4 in. at the deep end, giving an average depth of 3 ft. 9½ in. The floor of the bath is laid with white glazed bricks, interspersed with blue diving lines. The water is supplied to this and to all the other baths from the main of the Staffordshire Waterworks Company. The bath contains, when full, upwards of 60,000 gallons of water. At the shallow end of the bath, to the right of the entrance, is fixed a copper "spray pipe," by which a spray of water may be projected over a considerable portion of the bath. This is with the view of aërating the surface of the water, so as to keep the bath fresh and cool for a long time, besides serving as a shower-bath for the bathers. There are twenty-four dressing-boxes, twelve on either side, surmounted by a substantial gallery for spectators. In the second-class swimming-bath, which adjoins the one just described, the arrangements are, in the most essential points, similar to those of the first-class bath. The dimensions are 55 ft. 6 in. by 30 ft., the depth being from 3 ft. 3 in. to 5 ft. 6 in. The floor and sides are cemented in place of the white glazed bricks of the other bath. The capacity is about 48,000 gallons.

The portion of the baths devoted to ladies is approached through the hall nearest the clock-tower. The fittings and arrangements are the same in every respect as those of the other divisions. There is at the extreme end of the corridor, to the left of the entrance-hall, a plunge-bath. There are two first-class private warm baths (fitted with showers), and one vapour bath. The second-class division contains four

warm baths. There is also a dressing-room in the basement of the clock-tower adjoining the plunging bath.

The engineering arrangements consist of two steam boilers,—each 16 ft. by 5 ft.,—which supply the heating power for the swimming-baths, the supply of hot water for the private and vapour baths, and also steam for driving the very complete steam laundry, which is on the ground floor above the boilers. The washing-machines used are Bradford's "Vowels." In the laundry is fixed Bradford's improved water-heater. This is supplied with steam from the boilers, which passes through a copper coil: the condensed water after entering the waste is returned direct into the boilers. The heating of the swimming-baths is accomplished by means of "live" steam injected into the water of the baths direct from the boilers. This has been found, after considerable experiment, to be the most economical way of heating baths. In proof of this an experiment was carried out the other day by Mr. Arden Hardwicke, the borough engineer, when the second-class swimming-bath was heated from a temperature of 53 deg. to 75 deg. in two hours and a half, and with a very small consumption of fuel.

The whole of the building has been designed by the borough engineer, Mr. Arden Hardwicke, Assoc.-Mem. Inst. C.E., and the work has been executed under his immediate supervision. The contractors for the building are Messrs. H. & R. Inskip, of Longton. The boilers, machinery, and engineering work, including the plant in the laundry, have been produced by Messrs. Thomas Bradford & Co., of Manchester, under the personal superintendence of Mr. Alfred Giles. The plumbing work is being executed by Mr. G. H. Plant, of Longton; and the whole of the gas arrangements are by the Corporation's gas department. The estimated cost of the whole of the building, including fixtures, &c., is 8,000*l*.

SOCIAL.

RESPONDING to a hearty invitation from Mr and Mrs. l'Anson, the President and Council of the Royal Institute of British Architects paid them a visit on the 22nd inst. at their country residence, Grayshott Park, Hants. Mr. l'Anson is one of the original members of the Institute, and many of his brother members of the council were glad of the opportunity of showing their regard for him. A pleasant journey through a pretty country, a *déjeûner à la fourchette*, and a ramble through the somewhat extensive grounds, with their bright piece of water, sufficed to fill up all the time at their disposal.

The party included Mr. G. E. Street, R.A., the president; Professor Hayter Lewis, V.P.; Mr. Ewan Christian, V.P.; Mr. Charles Barry, past president; Mr. F. C. Penrose, M.A.; Mr. A. Blomfield, M.A.; Mr. David Brandon, F.S.A.; Mr. Jas. Brooks, Mr. Arthur Cates, Mr. Clarke, Mr. W. White, F.S.A.; Mr. Macvicar Anderson, Mr. Henry Currey, Mr. John Gibson, Mr. O. Hansard, Mr. E. B. l'Anson, Mr. A. Waterhouse, A.R.A.; Mr. E. Woodthorpe, a near neighbour; and Mr. William H. White. Sir Frederick Leighton, P.R.A.; Mr. Salvin, and some few other private friends of the host and hostess, as well as some few members of the Council, were kept away by previous engagements.

Although strictly a private visit, we fancy this brief record of a pleasant outing will not displease any who were concerned.

MR. JAMES ALLANSON PICTON, ARCHITECT.

WE hear with the sincerest pleasure that a letter has been received from Mr. Gladstone announcing that the Queen has been pleased to confer the honour of knighthood on Mr. James Allanson Picton, author of the "Memorials of Liverpool," and for over thirty years a member of the Liverpool Corporation. Mr. Picton took a prominent part in public life as the founder and director of the Liverpool Free Library and Museum, and on the opening of the Picton Reading-rooms two years ago was entertained at a public banquet, presided over by Lord Derby. We have on many occasions, ranging over a series of years, expressed our admiration of Mr. Picton's unflagging endeavours to benefit his native town, and have assisted in making known his own admirable works, and we rejoice greatly that his services are to be fittingly recognised.

SALE OF A LARGE BUILDING ESTATE, WOOD-GREEN.

LAST week Messrs. Fox & Bousfield offered for sale at the Auction Mart an important freehold property, designated the Chitt's Hill Estate, situated at Wood-green, on the high road to Southgate, and described as within six miles from the city, and within ten minutes' walk of four railway stations. The auctioneer stated that the property comprised a spacious mansion and forty-one acres of land, immediately available for profitable development by being divided into building plots. He observed that if they gave him 1,000*l*. an acre for the property, it would be less than the value of land in the locality. The first offer was 20,000*l*., and the property was ultimately sold for 29,000*l*. A freehold residence, with seven acres of land, situated between Tottenham and Southgate, was next offered, and sold to the purchaser of the previous lot for 7,000*l*.

OPENING OF THE CLACTON-ON-SEA WATERWORKS.

ON Tuesday last the Directors of the Clacton-on-Sea Gas and Water Company formally opened their waterworks at Clacton. The ceremony of starting the engines and pumps, and turning on the water to the town mains, was performed by Mr. S. Chaplin, Mayor of Colchester, in the presence of a large assembly. The engineer, Mr. Jabez Church, M. Inst. C.E., who designed and carried out the works, explained the working of the machinery, and conducted the party over the works, which were tastefully decorated with flags and flowers. The Mayor, in an appropriate speech, declared the works to be opened. The party then walked through the company's gasworks (which adjoin the waterworks), where the process of gas manufacture was explained, and afterwards assembled at the Royal Hotel to do justice to a good dinner.

These waterworks were commenced in May, 1880 (trial borings having previously been made), by the sinking of an artesian well to the depth of 120 ft. from the surface, with a boring continued to a depth of 405 ft. into the chalk. The water, which is said to be of a remarkably good quality, is pumped into the tower by a 15-h.p. engine, and "bucket and ram" pumps in duplicate.

The tower itself, which is built of red brick with Bath stone dressings, is 101 ft. high, and contains a wrought-iron circular tank, holding over 30,000 gallons, which is carried on wrought-iron girders. The service of water will be constant, and the pressure of water sufficient to throw a powerful jet over the highest house in Clacton.

The contractor for the well and main-laying was Mr. T. Tilley, of Walbrook; for the engines, boiler, pumps, and tower-tank, &c., Messrs. H. Young & Co., of Pimlico; Messrs. Saunders & Son, of Dedham, Essex, were the builders, and Mr. H. Caldicott was the clerk of works.

THE ROYAL ARCHÆOLOGICAL INSTITUTE AT BEDFORD.

ON Monday the annual congress of the Royal Archæological Institute was inaugurated at Bedford. The president of the meeting is Mr. Charles Magniac, M.P., of Colworth Park.

At twelve o'clock the Mayor and Corporation of Bedford welcomed the arrival of the members of the Institute in formal state at the New Corn Exchange, when the town clerk read a congratulatory address, acknowledging the honour paid by the Institute to their ancient town. This address was followed by others from the Bedfordshire Antiquarian and Architectural Society, and from the committee of the local Literary Institute, which were all courteously acknowledged by Lord Talbot de Malahide.

Mr. Magniac, the president of the meeting, delivered an inaugural address, in the course of which he heartily welcomed the arrival of the congress, and expressed a hope that they would turn to good use the opportunity of investigating the antiquities of the county and neighbourhood, and would assist the local students by their wider experience. He drew a brief sketch of the past annals,—for they could hardly be styled history,—of Bedfordshire under the Romans, Britons, Saxons, and Normans, and enumerated the chief points at which the annals of Bedfordshire threw a light on those of England. In confirmation of a remark made by Lord Talbot de Malahide, he expressed a hope that before long an attempt would be made to compile a systematic county history of Bedfordshire,—a work which could never be satisfactorily executed except by co-operation and sub-division of labour. He concluded by drawing the attention of the meeting to the great and important light that had been thrown on the history and civilisation of ancient peoples in the far distant East by the researches of Layard, Rawlinson, Wilkinson, and Schliemann, remarking that England also, and even Bedfordshire, had a past, and that that past was well worthy of serious study.

A large number of ladies and gentlemen were subsequently entertained by the Mayor and Corporation at luncheon in the Corn Exchange, and during the afternoon the members of the Institute, under the guidance of the local secretaries, perambulated the town, visiting the site of the old castle and its keep, the churches of St. Mary and St. Peter, and the remains of the Greyfriars Priory on the west side of the town. The evening was devoted to the reading of papers in various sectional meetings at the public rooms, which have been placed at the disposal of the members of the congress during the week.

MORNINGSIDE.

SIR,—The information in your Edinburgh article as to the purchase and proposed conversion of the United Presbyterian Church at Morningside into a literary institute is not quite accurate. The cost of the alterations is estimated at only 800*l*., and not 2,000*l*. This is the recommendation of the provisional committee, but of course the plans will be subject to revisal by the directors of the company when formed. They (the committee) did not think that they would be justified, from the limited revenue they expected, in going to greater expense meantime. They had particularly in view, too, the fact that the usefulness of a kindred institution situated in the suburbs of Edinburgh has been much impaired by its being started with too large a capital. With regard to the "air and space" in the proposed lecture-room, I may mention that the height from the floor to the ceiling will be 28 ft.

A MEMBER OF THE COMMITTEE.

LEITH IMPROVEMENT SCHEME.

SIR,—In a notice of the Leith Improvement Scheme, which appeared in the *Builder* of the 25th June last, the writer of the notice, in referring to the writer of this letter, states that the objector appeared in person before the Committee of Parliament, but that his objections were more devoted to the working of the Act than to the merits of the scheme.

This is a misconception of my position. My objections were entirely based on the proved fact that there was in reality no scheme of improvement submitted, there not having been one particle of reconstruction shown or provided for in the plans,—or rather plan, for there was only one of them,—before Parliament, or in existence. The Act itself is a good Act when faithfully administered.

JAMES HEDDLE.

DAMP: A QUESTION.

SIR,—I should like to have the opinion of some of your readers as to the cause of the following curious phenomenon. It is that of the cellars of a house, the floors of which are invariably *wet* in dry weather and *dry* in wet weather. The floors are formed of concrete and Portland cement, and the level of same is about 8 ft. below the level of the ground outside. The house stands upon a clay soil.

The land round about the house is drained by means of agricultural drain-pipes, laid about 3 ft. below the surface.

X. Y. Z.

CHURCH-BUILDING NEWS.

Holtby.—The small but interesting old church of Holtby, near York, having undergone restoration and refitting, has been re-opened. The cost of the work has been about 1,000*l*. Churchwarden restorers 100 years since had taken down the upper part of the stone building, removed the leaden roofs and ancient mullioned windows, and replaced the walls with brick and the windows with sashes, but fortunately they were content to go thus far without disturbing the foundations. Several feet of stonework, and what is believed to be the base of an ancient apse, remained untouched. The form and workmanship of these remains, it was thought, pointed to a very early origin, and the architect (Mr. J. R. Naylor, of Derby) has given due weight to these remains as indicative of the style adopted. The contractors for the works were as follow:—Mr. W. Rookledge, carpenter and joiner's work; Mr. C. Kilvington, mason, bricklayer, and plasterer; Mr. Dodgson, tiler's work; Messrs. Hodgson & Son, plumber and glazier's work; Mr. Boynton, painter's work, all being residents of York.

Newcastle (Staffordshire).—St. George's Church was re-opened on the 8th inst. after restoration. The church was erected about fifty-three years ago by the Ecclesiastical Commissioners, and is of the style of Gothic archi-

tecture in vogue at the commencement of its revival. About two years ago considerable alterations were made to the east end, as far as the funds permitted, by the formation of a chancel out of the eastern bay of the nave, and the formation of a proper choir therein. The completion of the whole scheme of restoration has now been carried out by the removal of the high-backed pews, the re-arrangement of the aisles, and the re-seating of the whole church with open benches of pitch pine. The interior has been cleaned and painted. The old stone paving has been removed from the aisles, and new tile paving by the Campbell Brick and Tile Company substituted for it. The projecting part of the west gallery has been removed, and the remaining part of this gallery over vestries has been re-seated, and a new front of pitch-pine added. A new font, by Jones & Willis, of Birmingham, has been fixed near the south door. Just before the closing of the church on Easter Day of this year, a new stained-glass window, by Messrs. Hardman, of Birmingham, was placed at the east end of the south aisle. It was the gift of Mr. R. Mosley, as a memorial to his daughter. Since then the old east window has been removed, and a five-light tracery window substituted for it. This will shortly be filled with stained glass by Messrs. Hardman, and is the gift of Mr. H. Coghill. A new tile reredos is in course of preparation by Messrs. Minton, Hollins, & Co. The whole of the works have been carried out by Messrs. H. & R. Inskip, of Longton, from the designs and under the superintendence of Messrs. Thomas Lewis & Sons, architects, Newcastle. The cost of the restoration has been about 1,400*l.*

Westleigh.—The Bishop of Manchester has consecrated the new Church of St. Peter at Westleigh, which has been erected at a cost of 7,000*l.* by Mrs. Sarah Walker Hampson, of Cheltenham. The site, which contains 1,460 square yards, has been given by the Rev. J. H. Stanning, vicar of Leigh. The church has been built from the designs of Messrs. Paley & Austin, architects, Lancaster, and will seat 424 persons.

STAINED GLASS.

Barton-on-Irwell.—A stained-glass window has just been erected in Barton-on-Irwell Church, Manchester. The window is in character with the style of the architecture, viz., Early English. The subject illustrated is the Parable of the Sower, treated in medallions, the centre medallion containing the principal figure of the Sower, and the upper and lower medallions "The end of the world, with the reaping angels," and "The enemy sowing tares while the husbandmen sleep." The work was designed and executed by Messrs. Shrigley & Hunt, Lancaster and London.

Edinburgh.—A stained-glass window, dedicated to the memory of the late R. S. Grindlay by his fellow-students, has been erected in the Chapel at Fettes College. The three main compartments contain a representation of the scene at our Lord's sepulchre on the morning of his resurrection, as recorded in the 20th chapter of St. John. The rich Flamboyant tracery is filled with diapered glass. The design and execution of the glass are by Messrs. Ballantine & Son.

Charterhouse, London.—Three Munich windows representing the Crucifixion have just been erected by Messrs. Mayer & Co., in the Church of St. Mary, Charterhouse, to the memory of the Rev. W. B. R. Jacobson, a former vicar of the parish; and a fourth light, containing a figure of St. Peter, in memory of Captain Rowland Bentinck Codd, late Governor of H.M. Prison, Clerkenwell.

Micheldever.—During the week ending July 2nd, a stained glass window was placed in the west end of the parish church. The style of glass used is that of the fifteenth century. The window is a six-light one, in two tiers of three each, the first light, which is in the upper tier, representing Mary (the mother of Jesus); the second, Jesus Christ; the third, Martha; the fourth, the Women at the Sepulchre; the fifth, the Angels at the Sepulchre; and the sixth, St. John and St. Peter, St. Peter being represented holding keys. The work reflects great credit on the firm of Messrs. Clayton & Bell, of London.

Bristol.—A large window has been fixed at the west end of Christ Church (Congregational), Sneyd Park, Bristol, to the memory of Mrs. Derham, wife of Mr. James Derham, of Sneyd Park. The window was designed and executed by Messrs. Camm Brothers, of Smethwick, near Birmingham. It contains eighteen subjects typical of the Old and New Testament history.

Birmingham.—A new window has been placed in the north side of the chancel of St. Martin's Church, Birmingham, as a memorial to the late Rev. Canon Miller, of Greenwich, formerly rector of St. Martin's, by the members of the congregation. The subjects of the window are selected from the life of St. Paul, and are as follows:—"St. Paul's Conversion," "Before Festus and Agrippa," "Prisoner at Rome," and "Paul at Athens." The window contains three lights and traceries. The upper portion of the lights is occupied by the large subject of "Paul on Mars Hill." Paul as the central figure stands with his hand uplifted, delivering his message; and below him are the Areopagites seated, with other listeners, among whom is Damaris, standing or seated behind them. At the back of Paul rises the Acropolis, with its walled enclosure and temples. Below this subject, and divided by a band containing the text, "Then Paul stood in the midst of Mars Hill, and said, 'Ye men of Athens, I perceive that in all things ye are too superstitious," are the three minor subjects. The window has been designed and executed by Messrs. Camm Brothers, of Smethwick.

Newington.—The large east window of St. Andrew's Church, New Kent-road, has lately been filled with stained glass. The subjects represented are the "Crucifixion," "Resurrection," "Healing the leper," and "Christ blessing children." In the tracery is represented the "Majesty" surrounded by cherubs, the "Agnus Dei," "Pelican in her piety," and several other emblems. The window is the gift of Mr. Jerman Nobes, and has been designed and executed by Mr. Charles Evans.

SCHOOL BUILDING NEWS.

Tollington Park, Holloway.—The new buildings at the Collegiate School, Tollington Park, recently erected at the cost of Mr. R. Wills for the Principal, Mr. W. Brown, were opened a few days ago. The new school-room (which is on the first floor) is 62 ft. long by 29 ft. wide, and 23 ft. from floor to apex of roof, with communications on each side to adjoining houses; the one at entrance being the residence of the Principal, the other house being devoted to the use of the masters and boarders, while the ground-floor is arranged as class-rooms connected with the school-room. The roof is of composite construction, having wrought-iron trusses with fir wrought purlins and ridge, covered with wrought and jointed boarding, roofing felt, and slates. The floor, which is also composite, is carried by rolled iron girders on piers built in cement, with buttresses on outside of wall, and by cast-iron columns in centre of each girder; at the west end of room a platform is constructed to receive the organ, also for the use of pupils during examinations. The ironwork was supplied by Messrs. Measures Bros. The ventilation is by inlets from below the floor, opening into the room at dado level. For the artificial lighting, two sunlights are provided. The space immediately under the schoolroom is devoted as a cloister for the use of pupils during the wet weather. The playground is laid with tar paving supplied by Messrs. Hobman & Co. The walls of the schoolroom are faced externally with picked stocks. The front elevation, which is of a Queen Anne character, is built of stocks, relieved with red brick dressings, with terra-cotta balustrade and capping. The entrance and lights to cloisters are provided with wrought-iron gate and grille. The works have been carried out by Mr. Harold, from the designs and under the superintendence of Mr. F. H. Stringer.

Grampound.—Sir John St. Aubyn, bart., M.P., has laid the foundation-stone of the new Wesleyan Sunday-school building at Grampound. Messrs. Gillard & Bennett are the architects, and Messrs. R. Treguona & B. Turner are the contractors.

Lewes.—New Sunday-schools for St. Michael's parish, Lewes, are now in course of erection by Mr. Edward Pullinger, builder, the architect being Mr. Philip Currey.

Truro.—The Lord Mayor of London recently laid the foundation-stone of the Cornwall Wesleyan Middle-class Schools at Truro. The schools, which will accommodate about 150 boarders, besides day-scholars, are of Gothic design, and built of local stone, with brick and granite facings. Mr. Ewtwell, of West Bromwich, is the architect; and the contractors are Messrs. Julian & Sons, Truro. The amount of the contract is 5,185*l.*, including the building of the master's residence.

Books.

Dirty Dust-bins and Sloppy Streets: A Practical Treatise on the Scavenging and Cleansing of Cities and Towns. By H. PERCY BOULNOIS, C.E. London: E. & F. N. Spon. 1881.

THE object of this little book is not merely to assist surveyors of towns in their endeavours to do their duty properly, but to interest the householders in the subject, and lead them to aid in the good work. It is well calculated to effect these purposes. Mr. Boulnois arrives at the opinion that the work of the collection of house-refuse and cleansing the streets should be carried out by the local authority with their own officers and staff, and that executing this work by contract is a mistake and a false economy. It may possibly be true that it may be done in the latter manner at less actual cost to the ratepayers, but he thinks, and we agree with him, all public work should be done in the best manner possible, irrespective of cost, thoroughly, but without extravagance, and that the result of such work, especially where it affects the cleanliness and the appearance of a town, soon fully repays any moderate extra cost that may thus have been incurred, irrespective of the enormous benefit that is conferred upon any community by the reduction of disease and the death-rate by a proper attention to such necessary sanitary work.

Miscellanea.

Building Stones in America.—The United States Census Bureau has undertaken an important work in collecting information relating to quarries of building, flagging, ornamental, and other kinds of stone in all parts of the country. The inquiries cover not only the location and extent of the stone, but the amount of capital employed, the annual output, methods of quarrying and dressing, number of hands employed and wages paid, methods of transport and their cost, number of structures of all sorts made of each sort of stone, and so on. All of the quarries in the United States which produce such an amount of material as to give them anything more than local importance are to be visited by gentlemen of scientific reputation. In many areas, these gentlemen are the State geologists; in others, they are professors or architects. The statistics which are to be gathered by these gentlemen will give the locations of all important quarries; the kind of stone which they produce; the uses to which it is applied; the extent to which it is used in the neighbourhood, or shipped to distant points; the amount of material which is annually produced; the amount of material which has been produced as indicated by the area of the excavation; the size of a single block which has been extracted; the size of a block which might be extracted if desired; the structure of the stone as regards stratification and jointing; a description of the methods employed in quarrying, in dressing, and in transporting the stones; and scientific information concerning the geological age, and the forms in which the stones are found. Appended to the schedule upon which this statistical information is gathered, there are a number of pages which are to be devoted to remarks and to information which applies to the individual quarry under consideration. Dr. Hawes says the work has progressed so far "that we are able to say, that from the experience and knowledge of the parties who are gathering the statistics, we are obtaining a vast amount of most valuable information under the head of these remarks. And we also know that already in these remarks we have a great deal of information which will prove of much value to those who employ stones in construction." He rightly urges the importance of microscopic examination of stone.

City Property.—At the Auction Mart, a few days ago, Messrs. Edwin Fox & Bousfield sold the premises, No. 63, Gracechurch-street, occupying an area of 1,500 ft., with a frontage of about 14 ft., let at 160*l.* per annum, for 10,900*l.* Also two houses in Plough-court, Fetter-lane, let at 225*l.* per annum, for 4,500*l.*

A Brave Workman.—At a meeting of the Chapter of the Order of St. John of Jerusalem in England, held last week at St. John's Gate, Clerkenwell, General Sir John St. George, K.C.B., presiding, the silver medal for saving life on land was unanimously voted to George Everett, of Gloucester, for rescuing Edward Prickett, on June 13 last, from a position of great difficulty and danger. Some workmen were taking down a girder at the old City Gasworks, Gloucester. Prickett was on an iron column, 40 ft. high, at one end, and a man named Newey at the other. Suddenly the girder broke in the middle. Newey was flung into an adjoining tank and killed immediately. Prickett tried to jump on to the roof of an adjoining house, but was caught by a rope, and was thrown back into the cap at the top of the column, and became insensible. Attempts were made to reach him with a ladder, but the oscillation of the pillar was so great as to threaten to throw him out of the cap. Everett therefore volunteered to ascend the pillar, and did so by "swarming." He then held Prickett securely until ladders were so placed that he could lower him with a rope, at a risk of falling a depth of 80 ft., though fortunately he succeeded in descending himself also in safety.

The Tapestry at St. Mary's Hall, Coventry.—This fine old tapestry, which has been exhibited at South Kensington Museum for several months, has been returned and re-hung. The restorers are Messrs. Bartlett & Co., 18, Blenheim-street, Great Marlborough-street, London, who were entrusted with the work, on the recommendation of Mr. George Scharf, the director of the National Portrait Gallery, Messrs. Bartlett having effected the restoration in a manner that leaves no room to doubt their conscientious and faithful labours. Mr. Scharf says there is little doubt that the design of the tapestry was Flemish, and that it was most probably manufactured in this country. He considers it a fine example, but in describing it to the Society of Antiquaries in November last he said it was woven, not embroidered. The date he assigns to be about 1490, from the fact of the persons represented being Henry IV. and his Queen Margaret, and the members of his Court, but the costumes being characteristic of the reign of Henry VII. appeared to him to indicate that the work had been done in the time of that monarch.

St. Alban's Abbey Church.—At the last meeting of the Council of the Archæological Institute the following resolution was proposed by Sir Sibbald Scott, seconded by Mr. Matthew H. Bloxam, and carried unanimously:—"That the Council of this Institute desire to place on record the expression of their great regret at what they believe to be the unnecessary destruction of a large portion of the west front of St. Alban's Abbey Church, which has lately been carried out." Copies of this resolution were ordered to be sent to the chairman of the Restoration Committee and to the rector of St. Alban's.

Messrs. Macnaught, Robertson, & Co., of Bankend, Southwark, have issued a new section-book, in which they have classified the various sections of iron in most general use as much as possible, and in many cases given almost every variation of size capable of being rolled. From their extensive connexion with the leading English and Continental houses, together with their London stock and arrangements, we have found the firm able to supply with great promptitude. The present issue is likely to be of permanent use to home consumers as well as foreign shippers.

Horncastle's Newspaper List, 1881-82, is carefully compiled, and will be found handy to advertisers. Mr. Horncastle, in pursuit of his business as an advertising agent (a very well-known one too), gives in the shape of a preface some striking examples of the sums spent by particular individuals and firms in advertising, and the successful results of the course. He is quite right in saying it is of no use advertising in fits and starts; it must be done continuously and done wisely.

Exeter Art Exhibition.—An Art Exhibition,—confined to exhibitors in the county of Devon,—will be opened in the Albert Museum, Exeter, on the 15th of August, 1881.

Herr Ferdinand Keller, who first discovered remains of the ancient pile dwellings of Switzerland, died on the 21st inst., at Zurich, in his eighty-first year.

The Staff, to the number of forty, of Messrs. Merritt & Ashby, builders, dined at the King's Head, Chigwell, on Saturday last.

Tramways.—The tramway, as the parent of the railway, will always be regarded with interest in connexion with the subject of locomotion. The Gloucestershire *Chronicle* says:—When the practicability of using an iron line upon the ground for the passage of a wheeled vehicle was demonstrated, it was at once seen how greatly would be economised the force required to impel it, and, like many other simple things, it was a matter of astonishment that it had not been thought of before. The first iron road, we believe, was made at Whitehaven, in 1738, and a railway was laid down in Sheffield by John Carr in 1776. The term tram-roads is a perversion from Outram-roads, named after Mr. B. Outram, their inventor, in 1800. The iron tram-road from Wandsworth to Croydon was made in 1801, and in the same year the first iron railway was sanctioned by Parliament, with the exception of some which had been made by canal companies for branches to mines. In the following year the first locomotive engine ran, and in 1825 the Stockton and Darlington Railway, constructed by Stephenson and Pease, was opened. After this the use of tramways spread to coal-pits and quarries, and the improvements effected in the steam-engine necessitated modifications in the first forms which were used for railways.

Exhibition at Gandia, Spain.—A circular issued by the managing committee of this exhibition, which is to be opened at Gandia during the month of October next, announces that the railway trains and tramways running between Carcagente and Gandia have reduced 50 per cent. of their tariff fares on all the articles which may be carried by them for the above-mentioned exhibition, provided they are despatched during the month of September next. The committee therefore requests intending exhibitors to secure the accommodation necessary for their exhibits before the 15th of September, as it is the desire of the committee to afford every facility to all classes of exhibitors who may wish to join in this exhibition, which is expected to be very interesting, as stated by the industrial organs of Spain. Gandia is an agreeable town in Valencia, noted for the industry of its inhabitants, besides having some linen factories. Much hemp and flax grows here, and the culture of silkworms is carried on very extensively.

Sanitary Plumbing.—The sixth and last of Mr. Hellyer's lectures on the science and art of sanitary plumbing (given under the auspices of the National Health Society) was delivered on Thursday evening last, in the Hall of the Society of Arts, John-street, Adelphi, Professor Henry Robinson, C.E., of King's College, in the chair. We shall report the lecture,—which was to be repeated this (Friday) evening, the 29th,—in our next. In deference to an expressed desire, it has been arranged to hold a meeting for the discussion of Mr. Hellyer's lectures on Monday, the 15th prox., when Mr. Ernest Hart is expected to preside. Those who wish to speak on the occasion are desired to send their names to the Secretary of the National Health Society, 44, Berners-street.

Fatal Fall of a Building.—A child named Grace Jones, aged ten years, has died in Guy's Hospital from the results of injuries she sustained by the falling of a building in Southwark-square, Union-street, Borough. The "square" is reported to contain a number of wretched houses, long unoccupied, and which are stated to be the property of the Ecclesiastical Commissioners. Other children were seriously injured by the fall of the building. The line of the South-Eastern Company runs within a few yards of the portion of the premises which fell.

Bedford Park, Chiswick.—If any of our readers overlooked the advertisement in our last, announcing the proposed transfer of this estate to a company, and inviting applications for shares, they may be glad to have their attention directed to it. Full particulars, of what is a very interesting experiment, are given, so that intending investors can judge for themselves as to the prospects of the proposed company.

Sale of the late Sir Charles Reed's Mansion and Grounds, Tottenham.—We are told that this property was really purchased by the United Land Company for resale in plots in the ordinary course of their business.

Slate in Canada.—We hear that a valuable discovery of slate has recently been made on property owned by Mr. J. J. Vickers, of the Vickers Express Company, Toronto, within eleven miles of Fort William, Thunder Bay.

TENDERS

For the erection of new Coffee Tavern premises, 23, Paradise-street, Marylebone, for the Right Hon. the Viscountess Ossington. Mr. Chas. Fowler, architect:—

Watson Bros.	£3,995 0 0
Fairchild	3,988 0 0
Bangs & Co.	3,650 0 0
J. E. Hunt	3,574 0 0
Staines & Son	3,572 0 0

For the erection of a new school at Steam Mills, near Cinderford, Gloucester, for the Forest of Dean United District School Board. Mr. Alfred Smith, architect. Quantities by the architect:—

Pearson & Son, Ross	£2,753 0 0
D. C. Jones & Co., Gloucester	2,428 0 0
H. King, Gloucester	2,388 0 0
A. C. & S. Billings, Cheltenham	2,256 0 0
Coleman Bros., near Gloucester	2,215 0 0
H. Downton, Cinderford	2,200 0 0
Duggan & Norse, Hereford (accepted)	2,179 0 0

For additions and improvements to 4, Champion-park, Camberwell, for Mr. E. Dresser Rogers. Mr. E. P. Wheelock, architect. Quantities by Mr. H. E. Pollard:—

J. W. Sawyer	£994 0 0
J. Page	979 0 0
W. Smith	965 0 0
B. Colls & Sons	942 0 0
J. Tyerman	877 0 0
J. Vears & Co. (accepted)	875 0 0

For the erection of a dwelling-house, stables, and coachman's house at Carsick Hill, Sheffield, for Mrs. Birks. Mr. Edward Robert Robson, architect:—

Ridal & Arnison	£10,627 10 6
J. Hall, Thorp	9,905 15 0
Chadwick & Co.	9,679 0 0
J. Tomlinson & Sons	9,044 0 0
Job Stone	8,637 0 0
Wm. Bissett & Son	8,500 0 0

For the erection of four shops on the Oak Lodge Estate, Edgware-road, Kilburn, for Mr. E. Rose. Quantities by Mr. H. E. Pollard. Mr. W. Graves, architect:—

Kirk & Randall	£4,580 0 0
Bolding	4,425 0 0
Scott	4,335 0 0
Jackson & Todd	4,328 0 0
Hard & Pollard	3,898 0 0
Stimpson & Co.	3,869 0 0
Kellond	3,800 0 0
Toms	3,304 0 0
Ward & Lamble (accepted)	3,283 0 0

For alterations and building new stables at North-street, Marylebone, for Messrs. Carnick & Co. Mr. H. G. Wyatt, architect:—

White	£1,375 0 0
Longmire & Co.	1,193 0 0
Wildman	997 0 0
Ward & Lamble	963 0 0

For repairs and painting at 68, Hamilton-terrace, St. John's-wood, for Mr. W. Todd. Mr. H. E. Pownall, architect:—

Clarke & Mannooch	£239 0 0
J. Tinson	204 0 0
W. H. Butcher	176 0 0

For pulling down 103 and 104, High-street, Winchester, and building new premises, for Mr. T. A. Brown. Mr. A. W. Galbraith, architect. Quantities supplied:—

		Credit Old Material.
Sims Bros., Basingstoke	£8,050	£100
McManus, London	6,295	350
Macklin, Winchester	5,680	—
Patman & Fotheringham, London	5,633	350
Fielder & Son, Winchester	5,650	300
Stevens & Sons, Southampton	5,557	300
Marsh, Winchester	5,750	400
Carter & Son, Winchester	5,600	400
Sealey, Winchester (accepted)	5,433	531

For building a dwelling-house in the Longbridge-road, Barking, Essex, for Mr. W. Bowers. Mr. C. J. Dawson, architect:—

Howe (accepted)	£618 0 0

For building a house and shop in the Broadway, Barking, Essex, for Mr. J. Pearson. Mr. C. J. Dawson, architect:—

Mansfield, Stratford	£711 0 0
Barnes, Ilford	709 0 0
Argent, Barking	698 0 0

For proposed alterations and repairs to premises, 44, Lamb's Conduit-street, for Messrs. T. Minn & Sons. Mr. C. J. Dawson, architect:—

Lawrence	£550 0 0
Wells & Son	498 15 0
Langmead & Way	477 0 0

For alterations and repairs at the Greyhound, Milton-street, City, for Mr. Manley. Mr. H. J. Newton, architect:—

Minchin	£388 14 0
Burman	358 0 0
Walker (accepted)	280 0 0
New Counter.	
Skinner	£135 0 0
Heath	129 0 0

For alterations to the Crown beerhouse, Chapman-street, St. George's-in-the-East, for Mr. Prior. Mr. J. G. Needham, architect:—

Marr	£250 0 0
Poole	235 0 0
S. W. Hawkings	225 0 0

For repairing and painting the Aged Pilgrims' Asylum, Camberwell. Mr. E. P. Wheelock, architect:—

J. Marsland	£185 0 0
S. Cooper	145 0 0
P. Hawkes (accepted)	123 0 0

For the erection of a new Baptist Chapel, Gipsy-road, Lower Norwood. Mr. Hampden W. Pratt, architect. Quantities by Messrs. Evans & Deacon :—

Higgs & Hill	£4,680	0	0
Shillitoe	4,495	0	0
Bowyer	4,250	0	0
Deacon & Co.	4,198	0	0
Goddard & Sons	3,988	0	0
Smith & Sons, South Norwood (accepted)	3,967	0	0

For new cabinet, &c., at the Fountain and Grapes, High-street, Borough, for Mr. Richmond. Mr. H. J. Newton, architect :—

Warne (accepted)	£650	0	0

For rebuilding the church and repairing the tower at Wincle, Macclesfield, for the Building Committee. Mr. E. Witts, architect. Quantities supplied :—

Burrows & Moseley	£1,126	8	0
Moores (accepted)	1,123	18	10

For erecting and completing model dwelling-house, Nos. 16 and 17, Church-way, Somers-town, for Mr. Chas. Deakin. Messrs. John Saville & Son, architects :—

Fawkes	£1,813	15	0
Temple & Forster	1,700	0	0
Auley	1,627	0	0
Royal	1,616	0	0
Wall Bros.	1,590	0	0
Wood	1,498	0	0
Richardson (accepted)	1,355	0	0

For erecting and completing stabling and dwellings above, in the Grove, Chapel-street, Somers Town, for Mr. George Earley. Messrs. John Saville & Son, architects :—

Temple & Forster	£1,166	0	0
Wood	1,097	0	0
Hawkins	1,066	14	0
Wall Bros.	1,015	0	0
John Auley	960	0	0
Richardson	955	0	0
S. Walton	949	0	0
Royal (accepted)	859	0	0

For repairs, &c., to 16A, Hampden-street, Somers Town, for Mr. Carn. Messrs. John Saville & Sons, architects :—

Shiers	£220	0	0
Wicks	190	0	0
Royal	178	0	0
Sims	165	10	0
Hawkins	155	0	0
Hyde	115	0	0

For the erection of manager's house and other premises, High Barnet, for Messrs. Elliott & Fry :—

Marriott Bros., High Barnet	£1,950	0	0
G. & J. Waterman, Watford	1,893	0	0
W. James, Barnet	1,795	0	0
W. J. Beale, Battersea	1,637	0	0

For three chapels, registrar's house and offices, front boundary walling, railings, gates, piers, &c., at the West Derby Cemetery, Liverpool :—

Tomkinson & Son, Liverpool	£18,243	0	0
Hughes & Stirling, Liverpool	16,950	0	0
Middlehurst, St. Helen's	15,641	4	3
Yates, Liverpool	15,498	0	0
Woods & Son, Liverpool	15,293	0	0
Mattack, Keighley (accepted)	14,718	8	1
Total of lowest separate tenders	14,471	11	10

For two blocks of infirmary buildings, New Shoreham, Sussex, for the Board of Guardians of the Steyning Union. Mr. Samuel Johns, architect. Quantities by Mr. F. Thompson :—

Marshall	£12,184	0	0
Perry	11,473	0	0
Kirk & Randall	10,820	0	0
Morris	10,740	0	0
Wall Bros.	10,685	0	0
Longley	10,637	0	0
Peters & Redford	10,275	0	0
Chappell	10,000	0	0
Cru tenden	9,711	0	0
Jones & Co.	9,364	0	0
Cook & Co.	9,197	0	0
W. J. Beale (accepted)	8,777	0	0

For taking down and rebuilding wall at Norwood Cemetery. Mr. E. l'Anson, architect. No quantities supplied :—

Lathey Bros.	£399	0	0
Piper	344	0	0
McLachlan & Sons	290	0	0

For alterations to premises, Buckingham Palace-road, for Mr. Gorringe. Mr. Walford, architect. Quantities supplied :—

Adamson & Sons	£4,375	0	0
Dove Bros.	4,240	0	0
McLachlan & Sons	4,140	0	0
Patrick & Sons	4,089	0	0
Hall, Beddall, & Co.	3,751	0	0

For building House of Retreat, Lloyd-square, Clerkenwell. Mr. Newton, architect. Quantities by Messrs. Palmer & Ruault :—

Chappell	£9,000	0	0
Patrick & Sons	8,955	0	0
Booth	8,850	0	0
Bangs & Co.	8,830	0	0
Brass	8,710	0	0
Dove Bros.	8,510	0	0
Higgs & Hill	8,430	0	0
McLachlan & Sons	8,392	0	0
Tyerman	8,077	0	0
Perry & Co.	7,547	0	0

For alterations and additions to 4, Farnley-road, Catford-bridge, for Mr. W. Elkerton. Mr. N. W. Hopton, architect :—

Eldridge & Gee (accepted).

For rebuilding 141, Southwark Park-road, for Mr. G. Kirby :—

Eldridge & Gee (accepted).

For repairs and additions to premises, 72, Great Prescott-street, for Mr. Friedlander. Mr. J. Hudson, architect. Quantities not supplied :—

Wyard	£327	0	0
Hulett	319	0	0
Calnan & Co.	279	0	0
Rives	243	0	0

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All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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Is the best for use in all exposed positions, being a well-known and tried weather stone.
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Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, 73, Charlotte-street, Portland-place, W. [ADVT.

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COLLINGE'S PATENT HINGES, LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
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